THE LANCET

A Journal of British and Foreign Medicine, Surgery, Obstetrics, Physiology, Chemistry, Pharmacology, Public Health, and News.

Telegrams—LANCET, WESTRAND LONDON *Telephones*—GERRARD 4314 & 4315 *Offices*—423, Strand, London, W.C.2

No. I. OF VOL. I., 1926. **No. 5340. Vol. CCX.** LONDON, SATURDAY, JANUARY 2, 1926. Founded 1823. Registered as a Newspaper. Published Weekly. **Pp. 160—Price 1s.** Annual Subscription Inland £2 2s. Abroad £2 10s.

OXFORD MEDICAL PUBLICATIONS.

SEE PAGE 8.

J. & A. CHURCHILL PUBLISH

NEW EDITIONS OF BOOKS BY

BEAUMONT AND DODDS,
JELLETT—EDEN—HOLLAND,
LUCAS AND STEVENS,
STARLING—STILL—POULTON,
FOSTER MOORE AND
NEW BOOK ON PARASITES
Do. do. OBSTETRICS
Do. do. FOOD ANALYSIS.

See pages 6 and 7.

HYPNOTISM AND SUGGESTION. [5s. net.

4th Ed.]

By ALBERT E. DAVIS, F.R.C.S. Ed., L.R.C.P., Hon. Physician to the Liverpool Psycho-Therapeutic Clinic.

"A fascinating book."—THE DAILY NEWS.

Putnam's Sons Ltd., London.

JUST OUT.

DISEASES OF THE RECTUM AND COLON

AND THEIR SURGICAL TREATMENT.

BY

P. LOCKHART-MUMMERY,

F.R.C.S.ENG., M.A., M.B., B.C.CANTAB.,

Senior Surgeon to St. Mark's Hospital.

Over Two Hundred Plates and Illustrations. Price 25s.

Baillière, Tindall & Cox, 8, Henrietta-street, Covent Garden.

DR. MARIE STOPES' IMPORTANT WORKS.

CONTRACEPTION

(BIRTH CONTROL).

ITS THEORY, HISTORY, AND PRACTICE.

A MANUAL FOR THE MEDICAL AND LEGAL PROFESSIONS.

With Introductions by Sir WILLIAM BAYLISS, M.A., D.Sc. Oxon. and others.

Medical Times.—"The book is unique and marks a new era."

The Lancet.—"Much of the evidence contained in the book is quite unobtainable elsewhere."

Demy 8vo. Cloth. Pp. xxiv. + 416. With 4 full-page plates. 12s. 6d. net; post free inland 13s. 3d., abroad 14s.

"THE FIRST FIVE THOUSAND."

BEING THE FIRST REPORT OF THE FIRST BRITISH BIRTH CONTROL CLINIC.

Giving unique Statistical, Medical, and other data about 5000 Birth Control cases and containing new observations of the utmost importance to Medical Practitioners.

Paper, 2s. 6d. net; post free 2s. 8d.

London: John Bale, Sons & Danielsson, Limited, 83-91, Great Titchfield-street, Oxford-street, W. 1.

With 79 Illustrations on 40 Plates and 1 Text-figure. Demy 8vo. 12s. 6d. net; postage 6d.

INTERNAL DERANGEMENTS OF

THE KNEE-JOINT.

THEIR PATHOLOGY AND TREATMENT BY MODERN METHODS.

By A. G. TIMBRELL FISHER, M.C., F.R.C.S. Eng.

"The most complete account of internal derangements of the knee that has been published in English."—BRITISH JOURNAL OF SURGERY.

London: H. K. Lewis & Co. Ltd., 136 Gower-street, W.C. 1.

Just Published. With 62 Illustrations. Demy 8vo. 7s. 6d. net; postage 5d.

MANIPULATIVE SURGERY.

PRINCIPLES AND PRACTICE.

By A. G. TIMBRELL FISHER, M.C., F.R.C.S.Eng.

London: H. K. Lewis & Co. Ltd., 136 Gower-street, W.C. 1.

SAUNDERS'

STANDARD TEXT-BOOKS
FOR STUDENTS OF MEDICINE.

See Saunders' Advertisement on Page 3.

ON THE BREAST.

By DUNCAN C. L. FITZWILLIAMS, C.M.G., M.D., Ch.M., F.R.C.S. Ed. and Eng.

Royal 8vo. 456 pp. 2 Plates, 166 Illustrations. 30s. net.

LANCET.—"The book is packed with accurate clinical observations and bears evidence throughout of extensive clinical experience and wide reading on the part of the author."

Wm. Heinemann (Medical Books) Ltd., 20, Bedford-street, London, W.C. 2.

A HANDBOOK OF AURAL SURGERY.

By WILLIAM WILSON,

Oto-Laryngologist, St. John's Ear Hospital, &c., &c., Manchester.

JOURNAL OF LARYNGOLOGY—"Can be confidently recommended."

Sherratt & Hughes 15s. net. Manchester

STERILITY IN WOMAN:

ITS CAUSES AND TREATMENT.

By ROBERT A. GIBBONS, M.D., F.R.C.S.E.,

Gynæcologist to the Grosvenor Hospital for Women.

"It is written clearly, and should make a special appeal to the general practitioner . . . . . We can heartily recommend this useful and well-written book."—THE LANCET.

"The volume provides an admirable account of the whole subject. It is sufficiently full for the needs of the family practitioner, and is written in a refreshingly clear and lucid style."

—BRITISH MEDICAL JOURNAL.

With 44 illustrations, 12s. 6d. J. & A. Churchill, 1925.

TWO NEW EDITIONS

SECOND Edition. Thoroughly Revised. With 159 Illustrations (6 in Colours) from Original Drawings and Photographs. Demy 8vo. **12s. 6d.** net; postage 6d.

THE PATHOLOGY OF TUMOURS

By **E. H. KETTLE**, M.D., B.S.Lond., Professor of Pathology and Bacteriology, Welsh National School of Medicine, Cardiff; formerly Pathologist, St. Mary's Hospital, and Lecturer on Pathology, St. Mary's Hospital Medical School, London.

"A model of conciseness .... The present edition is a worthy successor to the first, and will occupy a sure place among books of reference."—THE LANCET.

THIRTEENTH Edition. Thoroughly Revised. With 9 Coloured Plates and 278 other Illustrations. **21s.** net; postage 9d.

SWANZY'S HANDBOOK OF DISEASES OF THE EYE AND THEIR TREATMENT

Revised and Edited by **LOUIS WERNER**, M.B., F.R.C.S.I., Sen. Mod. Univ. Dub.; Surgeon, Royal Victoria Eye and Ear Hospital; Professor of Ophthalmology, University College, Dublin; and Examiner in Ophthalmology, Dublin University.

"Swanzy's text-book ..... undoubtedly remains one of the best. ..... One of the features of this volume is the excellence of the illustrations."—THE LANCET.

LONDON: H. K. LEWIS & CO. LTD., 136 Gower Street and 24 Gower Place, W.C.1

Acidophilus Therapy

BACTOL

(Morgenstern)

A concentrated, stable, homogeneous and palatable emulsion of

B. ACIDOPHILUS (about 250 millions per c.c.)

AGAR-AGAR, PETROLAT. liq. (heavy) SACCH., flavouring.

Indicated in Constipation, Intestinal Stasis with Chronic intestinal putrefaction, etc.

While the B. bulgaricus cannot establish itself as an inhabitant of the intestinal tract and soon dies off, the B. acidophilus, being a native of the bowel, very quickly establishes itself in its normal habitat and multiplies freely.

BACTOL will acidophilise the intestinal tract and thus correct putrefaction characterised by flatulence and foetid faeces.

Send for Booklet, "Intestinal Stasis and Toxaemia."

E. H. SPICER & CO., 72 WIGMORE STREET, LONDON, W.1.

THE LANCET

No. 5340. LONDON, SATURDAY, JANUARY 2, 1926. CCX.

CONTENTS

THE WHOLE OF THE LITERARY MATTER IN THE LANCET IS COPYRIGHT.

CONVOCATION ADDRESS
on the Widening Range of Medicine. Delivered at the Congress of the American College of Surgeons held at Philadelphia. By LORD DAWSON OF PENN, G.C.V.O., M.D. ... 1

ORIGINAL ARTICLES.
On some New Methods, Devices, and Apparatus for the Routine and the Research Laboratory. By Sir ALMROTH E. WRIGHT, M.D., F.R.S.—(*Illustrated*) 4
Irradiation of Foodstuffs with Ultra-Violet Light. By HELEN M. M. MACKAY, M.D., M.R.C.P., and HAROLD F. SHAW, M.B.—(*Illustrated*) 8
Ultra-Violet Irradiation in the Activation of Cholesterol and Foods. By ALFRED F. HESS, M.D., and MILDRED WEINSTOCK 12
Ischæmic Necrosis of the Cardiac Wall. By CAREY F. COOMBS, M.D., and GEOFFREY HADFIELD, M.D.—(*With Coloured Plate*) 14
Incomplete Intestinal Obstruction. By T. I. CANDY, M.B.—(*With Illustrative Plate*) 15
Borocaine: A New Local Anæsthetic. By E. WATSON-WILLIAMS, F.R.C.S. 16
A Lung Splint. By R. C. WINGFIELD, M.B.—(*Illustrated*) 17

CLINICAL AND LABORATORY NOTES.
Hæmolytic Icterus Treated by Extirpation of the Spleen. By L. S. HANNEMA, M.D. 18
Exceptional Hyperglycæmia Without Coma. By E. BOSDIN LEECH, M.D., and GARFIELD THOMAS, M.Sc. 20

MEDICAL SOCIETIES.
Liverpool Med. Institution. 20

REPORTS AND ANALYTICAL RECORDS.
Bactol Morgenstern.—Antiphlogistine 24

REVIEWS AND NOTICES OF BOOKS.
The Diagnosis and Treatment of Tuberculosis of the Hip. By G. R. Girdlestone, F.R.C.S. 21
A Manual of Hygiene. By Sir William H. Hamer, M.D., D.P.H., and C. W. Hutt, M.D., D.P.H. 21
The Care and Cure of Crippled Children. By G. R. Girdlestone 22
Historic Instruments for the Advancement of Science. By R. T. Gunther 22
Operating Room Procedure. By Henry C. Falk, M.D. . 22
Die Stoffwechselkrankheiten in der Praxis. By Prof. Friedrich Umber..... 23
A System of Physical Chemistry. By Prof. William C. McC. Lewis, D.Sc. 23
An Intermediate Text-book of Physiological Chemistry with Experiments. By C. J. V. Pettibone, Ph.D. 23
John Stearne, M. and J.U.D. By T. Percy C. Kirkpatrick, M.D. 23
Flower Scent. By F. A. Hampton, B.M. 24
New Verse. By Robert Bridges 24

LEADING ARTICLES.
THE PUBLIC IMPORTANCE OF MEDICINE 25
THE OVARIAN HORMONE .. 26
THE BRITISH SOCIAL HYGIENE COUNCIL 27

ANNOTATIONS.
Atmospheric Pollution 28
The Evacuation of Sick by Aeroplane 28
Embryological Material 28
Encephalomyelitis and Distemper 29
Water-Supply and Chlorination 29
Arsenic in Apples 30
Sexual Offences Against Young Persons 30
The Human Constitution. 31

MODERN TECHNIQUE IN TREATMENT.
CLIV.—The Treatment of Chronic Mastitis. By GEOFFREY KEYNES, M.D., F.R.C.S. 31

SPECIAL ARTICLES.
Fractures in the Neighbourhood of the Ankle-Joint. By HARRY PLATT, M.D., M.S.—(*Illustrated*)—(*To be continued*) 33
The Doctor's Motor-Car.—(*Illustrated*) 40
Health of Royal Air Force . 41
Ireland: Medical Registration in Irish Free State. 42
Budapest: Alcohol and Tuberculosis 42
South Africa: Cape Town and Venereal Disease 44
Sexual Offences against Young Persons: Report of the Home Office Committee 45

PUBLIC HEALTH SERVICES.
Reports of Medical Officers of Health: A Brief Survey 46
School Medical Service: A Survey of 1924 46
Infectious Disease in England and Wales 47

THE SERVICES.
Royal Naval Volunteer Reserve.—Royal Army Medical Corps.—Royal Air Force 47

CORRESPONDENCE.
Glycosuria and Life Assurance (Dr. Otto May)..... 48
Impetigo Contagiosa (Dr. H. W. Barber)..... 48
Insulin and the Optical Activity of Urine (Prof. F. W. Fornet and Dr. E. Christiensen) 49
Fatigue and Infection (Dr. A. Garvie) 49
Professional Criticism of the General Medical Council (Mr. T. B. Layton, Dr. Freeland Fergus)..... 50
Professional Secrecy 51

PARLIAMENTARY INTELLIGENCE.
House of Commons: Illicit Cocaine Traffic in Bombay. —Medical Services in East Africa.—Poor-law Reform. —Lunacy and Mental Disorder.— Epileptic Patients at Maghull. — Dental Benefit for Insured Persons.— Medical Branches of the Services. —Notification of Diphtheria and Scarlet Fever 52

OBITUARY.
James Ritchie, M.D. 51
Henry Dunn Waugh, M.D.. 51
John Gough Nolan, M.B.... 51
John Jagger Pickles, M.R.C.S. 51
John Francis McClean, M.R.C.S. 51

MEDICAL NEWS.
University of Oxford 54
University of Cambridge .. 54
University of London..... 54
University of Durham 54
University of Liverpool 54
University of Birmingham.. 54
University of Dublin, Trinity College 54
Leeds: Smoke Abatement.. 20
Hospital Accom. at Swindon 44
Territorial Army Medical Officers Assoc. 54
Lecturers to Midwives 54
Roy. Inst. Public Health... 54
Brit. Inst. of Philosophical Studies 54
British Industries Fair 55
Pharmaceutical Society 55
Welsh Hospitals Dinner.... 55
Rontgen Society 55
Wireless at St. Bart.'s..... 55
Royal Salop Infirmary 55
"Daily Mail" Hosp. Ballot 55
Nat. Hosp. for Dis. of Heart 55
Dental Board 55
Coventry Hospital Saty.Fund 55
Long Waiting Lists..... 55
Hosp. Saturday Fund 55
Institute of Psycho-Analysis 55
Central Assoc. for Mental Welfare..... 55
Donations and Bequests.... 55

NOTES, COMMENTS, AND ABSTRACTS.
The History of Anthrax in the Wool Industry of Bradford, and of its Control. By F. W. EURICH, M.D.—(*To be concluded*) 57
Public Health in Tanganyika 59
A Good Feeding-Bottle 59
Cheerful Hospital Magazine. 60
An Anatomical Blackboard 60
Copper in Peas 60
Medical Missionaries 60
A Medical Calendar 60
Livingstone College..... 60

Medical Diary 56
Appointments 56
Vacancies 56
Births, Marriages, Deaths 56

THE LONDON AND COUNTIES MEDICAL PROTECTION SOCIETY LIMITED.

(FOUNDED 1892.)

Registered Office: VICTORY HOUSE, LEICESTER SQUARE, W.C.2.

Telegrams: "MEDICAVERO WESTRAND, LONDON." *Telephone:* REGENT 611.

President: Sir JOHN ROSE BRADFORD, K.C.M.G., C.B., M.D., F.R.C.P., F.R.S.
Treasurer and Chairman of Council: C. M. FEGEN, M.R.C.S., L.R.C.P., D.P.H.
Trustees for the Reserve Fund:
Sir R. DOUGLAS POWELL, Bart., K.C.V.O., M.D., F.R.C.P. Sir ANTHONY A. BOWLBY, Bart., K.C.B., K.C.M.G., K.C.V.O., F.R.C.S. Sir HARRY BALDWIN, C.V.O., M.R.C.S., L.D.S.

The Society was founded for the following purposes: To protect, support and safeguard the character and interests of legally qualified Medical and Dental Practitioners; to advise and assist Members of the Society in matters affecting their professional character and interests; and to indemnify them in regard to actions, etc., undertaken on their behalf.

SUBSCRIPTIONS. There is an Entrance Fee of 10s., and an Annual Subscription of £1.

The Invested Funds of the Society exceed £35,800. The Society is fully insured to an unlimited extent against all adverse costs and damages which may be awarded against Members in any action which the Society undertakes on their behalf.

Forms of application for Membership and full particulars may be obtained from the Secretaries at the above address.

THE LATEST VOLUMES IN
BAILLIÈRE, TINDALL & COX'S
Students' Aids Series

¶ The Students' Aids are specially designed to assist Students in grouping and committing to memory the subjects upon which they are to be examined.

Anatomy (Pocket Anatomy).
By C. H. FAGGE, F.R.C.S. Eighth Edition. Pp. viii + 313. Price **5**/–.

Bacteriology.
By WILLIAM PARTRIDGE, F.I.C. Fourth Edition. Pp. viii + 276. Price **5**/–.

Chemistry.
By W. PARTRIDGE. Pp. viii + 274. Price **5**/–.

Diseases of Children.
By J. [McCAW, M.D., L.R.C.P.Edin. Fifth Edition. Pp. xii + 404. Price **5**/–.

Dental Anatomy and Physiology.
By A. B. UNDERWOOD, L.D.S. Fourth Edition. Pp. vi + 170. Price **3**/**6**.

Dental Surgery.
By DOUGLAS GABELL, M.R.C.S., L.D.S.Eng. Third Edition. Pp. viii + 132. Price **3**/**6**.

Operative Dentistry.
By J. D. HAMILTON JAMIESON, H.D.D., L.D.S. Edin. Pp. viii + 168. Price **3**/**6**.

Medical Diagnosis.
By A. J. WHITING, M.D., C.M.Edin. Pp. viii + 177. Third Edition. Price **3**/**6**.

Electro-Therapeutics.
By. J. MAGNUS READING, F.R.C.S. Pp. viii + 196, with 16 Diagrams. Price **5**/–.

Forensic Medicine & Toxicology
By W. G. AITCHISON ROBERTSON, M.D. Ninth Edition. Pp. xii + 156. Price **3**/**6**.

Gynæcology.
By R. E. TOTTENHAM, M.D., B.A.O., F.R.C.P.I. Sixth Edition. Price **3**/–.

Histology.
By A. GOODALL, M.D. Second Edition. Pp. vii + 135, with 20 Figs. Price **3**/–.

Materia Medica.
By ARNOLD E. COLLIE, L.M.S.S.A. Pp. viii + 116. Price **3**/–.

Mathematics of Hygiene.
By R. BRUCE FERGUSON, M.A., M.D., B.C. Cantab., D.P.H.Eng. Fifth Edition. Pp. xii + 186. Price **3**/**6**.

Medicine.
By B. HUDSON, M.D., L.R.C.P. Third Edition. Pp. x + 370. Price **4**/**6**.

Obstetrics.
By C. J. NEPEAN, LONGRIDGE, M.D., F.R.C.S. Eng. Ninth Edition. Pp. viii + 232. Price **3**/–

Ophthalmology.
By N. BISHOP HARMAN, F.R.C.S.Eng. Sixth Edition. Pp. viii + 226. Price **3**/**6**.

Organotherapy.
By IVO GEIKIE COBB, M.D., M.R.C.S. Pp. viii + 184. Price **5**/–.

Osteology.
By P. TURNER, F.R.C.S.Eng. Second Edition. Pp. viii + 188. Price **4**/**6**.

Pathology.
By HARRY CAMPBELL, M.D.Lond. Fourth Edition. Pp. viii + 247. Price **4**/**6**.

Practical Pathology.
By F. W. W. GRIFFIN, M.D., and W. F. M. THOMPSON. Pp. xii + 248. Price **4**/–.

Physiology.
By R. A. KRAUSE, D.Sc., M.D.Edin. Pp. viii + 256. Price **3**/**6**.

Public Health.
By W. G. AITCHISON ROBERTSON, M.D., D.Sc., F.R.C.P.E. Pp. viii + 152. Price **3**/**6**.

Psychiatry.
By W. S. DAWSON, M.D., D.P.M. Pp. viii + 309. Price **4**/**6**.

Surgery.
By JOSEPH CUNNING, F.R.C.S., and CECIL A. JOLL, F.R.C.S. Fifth Edition. Pp. viii + 434. Price **4**/**6**.

Operative Surgery.
By H. C. ORRIN, O.B.E., F.R.C.S. Edin. Pp. viii + 230. Price **5**/–.

Surgical Diagnosis.
By C. P. G. WAKELEY, F.R.C.S., Assistant Surgeon, King's College Hospital. Pp. vi + 170. With 15 Figs. Price **3**/**6**.

Rational Therapeutics.
By R. W. LEFTWICH, M.D., C.M., M.R.C.S. Pp. x + 234. Price **4**/**6**.

Tropical Hygiene.
By R. J. BLACKHAM, D.P.H.Lond., Col. R.A.M.C. Second Edition. Pp. viii + 240. Price **4**/**6**.

The above are bound in cloth, and the prices given are net. If ordered by post 3d. extra should be added.

BAILLIÈRE, TINDALL & COX,
8, Henrietta Street, Covent Garden, London, W.C.2.

Convocation Address

ON THE

WIDENING RANGE OF MEDICINE.

Delivered at the Congress of the American College of Surgeons held at Philadelphia in October, 1925,

BY LORD DAWSON OF PENN, G.C.V.O., M.D., F.R.C.P. LOND.,

PHYSICIAN TO THE LONDON HOSPITAL; PHYSICIAN TO H.M. THE KING.

MR. PRESIDENT.—A double honour is my portion—your fellowship and the delivery of this address—and let me say how deeply I treasure it. If my expression of gratitude is brief, it is out of regard for the many other claims on your attention. I will ask you, then, to liken my appreciation to the small hand of the clock which, though ranging one-twelfth of the distance of the long hand, signifies 12 times as much.

We have just witnessed a short but moving ceremony—the conferring of the Legion of Honour by Dr. de Martel upon Dr. Charles Mayo. The honour and the services of the recipient are alike unique in distinction. To all of our tongue in whatever land they be, this recognition, not only of a great mind but of a genius for friendship, will bring rejoicing.

In the choice of a subject suitable to this occasion I was influenced by the knowledge that laymen, both interested and distinguished, would constitute a portion of the audience; so it occurred to me to present for your consideration how, on the one hand, medicine is increasing its contact with the sciences, and on the other hand, is extending the range of its influence to cognate activities in the body politic. Medicine has, so to speak, an outer and an inner temple. In the inner temple thought reigns, and in the outer action becomes the handmaid of thought. During the twentieth century progress in its sciences has been so notable that medicine has received fresh direction and inspiration. Thought is vivid, new pathways are opening out, and the time is instinct with new unfoldings. And yet we should not forget the debt we owe to the times which have preceded us. It has often been that we have reaped because they have sown, and their achievements measure large when the slenderness of their resources is remembered.

THE AWAKENING OF MEDICAL SCIENCE.

And since the spirit of science awoke from its long sleep in the seventeenth century, it has been the proud part of medicine to foster and advance the sciences on which it now increasingly rests. The dawn was first felt at Padua, where Vesalius, Fallopius, and others of world renown established human anatomy and where Harvey received a measure of that inspiration which gave life to physiology. Let me commend to those who have not yet undertaken it a visit to this ancient seat of learning. Those of us, gathered as we were from all countries, who met there to celebrate the 700th anniversary of its founding have a treasured memory of a historic pilgrimage to do honour to greatness.

To the early knowledge of physics the medical profession made notable contribution. Gilbert in the sixteenth century, Galvani and Young in the seventeenth century, stand forth as great discoverers in magnetism, electricity, and light respectively. They were all three physicians. The identity of the early progress of chemistry with the medical profession was even more close, and with biology are associated names such as John Hunter and Richard Owen. Of the total 115 original Fellows of the Royal Society, founded in the reign of Charles II., 25 were doctors of medicine. It is curious to reflect that side by side with these rich contributions to knowledge by doctors, the general practice of medicine was, until the nineteenth century, befogged by fanciful reasoning and fantastic treatment. It could not shake itself free from habits of thought which had their origin far back in primitive beliefs in magic and hostile deities. And in present times so persistent is tradition, the world is still imbued with belief if not in magic yet in the magical, to the detriment of its true interests. To quote Garrod in his eloquent Harveian oration:

> ". . . . The primitive medicine and the art of the medicine man survive to this day among the savage races of the earth, and he would be a bold man who should deny their survival amongst those races which regard themselves as the highest products of civilisation. Are any of us wholly free from such ideas?"

It is difficult for us to convince the public that we have no wonders to offer except those to be found along the narrow and straight path of rational endeavour, and this is especially true in the realm of therapeutics. We in the profession might set example by a more critical examination of our ways and means. We are apt to forget how many of our remedies and formulæ have descended by apostolic succession from previous generations. In order to illustrate, not what our formulæ are but from what they have descended, let me quote you "An Excellent Medicine for the Dropsie made for Queen Elizabeth by Doctor Adrian and Doctor Lacy":

> "Take Polipodium, Spikanard, Squat, Ginger, Markoram, Galingal, Setwel, of each a penny weight, Setna leaves and cods, so much as all the reft grofly beaten, put them into a bag, and hang it on an earthen pot of two gallons of Ale, and every four dayes cover the pot with new Barm, and drink no other drink for fix daies, and this fhall purge all ill humors out of the body, neither will it let the blood putrifie, nor flegme to have domination, nor Choller to burn, nor Melancholly to have exaltation, it doth encreafe Blood, and helpeth all evill, it helpeth and purgeth Rheum, it defendeth the Stomack, it preferveth the body and engendereth good colour, comforts the fight and nourifheth the Mind."

There are features of this prescription which might make it popular to-day and even in this country! And yet in that grey light there were glimmers in the sky. For instance, digitalis was in the Pharmacopœia of 1665. Another example of cycles in knowledge is to be found in the fact that Gairdner recommended iodine for goitre 100 years ago. And that is dwarfed when we learn from Prof. Schmidt that a herb, Ma Huang, containing an active principle similar to adrenalin, was sanctioned by the emperor, Shen Nung, and used over 5000 years ago.

THE FOUNDATIONS OF MEDICINE.

Of the sciences on which medicine is now firmly founded, physiology, chemistry, and physics stand forth prominently, and their growing territories are widening the range of medicine. Chemistry in particular seems to be acquiring increasing contact with the living body and mind, and one wonders, now that the mysteries of the atom have been penetrated, whether in the future physics may not gather physiology and chemistry unto itself. And perhaps one of the reasons why the honour of your choice has this year fallen upon a physician is the recognition on your part that the progress of surgery will henceforth depend, and in increasing measure, on coöperation with medicine. Although technique will continue to improve it will not command the position it has hitherto done. Speaking as a physician who has always been in close association with surgery, I suggest there is, here and there, a tendency to over-emphasise mechanical aids, forgetting that greatness in art is to be found in simplicity. Your thoughts are turning to the study of the tissues and forces of the patient. With you, as with the physician, the cry is: "Back to the soil."

The fear of sepsis no longer possesses the surgeon, though it still influences his thought. You now rely on studies; it may be of liver, or pancreatic function, of sugar, chloride or non-proteid nitrogen content, of metabolic rates. These help you to understand the problem of each patient, the peculiarities, even

the perversities, of his symptoms, and to either prepare him for operation or even excuse him operation, or guide him to convalescence. Such coöperation with medicine will bring you results hitherto undreamed of. Is it not possible that bio-chemistry helps to measure the physical aspect of individuality? In the days when acute infections played so dramatic a part in life and death amongst peoples, when medical men were so largely occupied with their visitation and impressed with their own relative powerlessness to battle against them, it was only natural that thought should envisage disease more as an evil force from without and set less value on the qualities belonging to the patient.

The banishment of typhoid and other fevers from our midst, the power over the protozoal diseases, the diminishing force of tubercle and syphilis, even acute rheumatism with the damage it inflicts on young life, is less powerful for evil—these and other achievements bear witness to a changing scene.

THE STUDY OF THE INDIVIDUAL.

The subinfections which play a relatively larger part in the health problems of to-day bring home to us the importance of the individual or host, and the make-up of his body and mind. Their activities in each individual would seem to be determined by some internal factor—some nidus or influence which is probably specific for that person. Thus an attack of rheumatoid arthritis from infected teeth is determined as much by the internal factors individual to that patient as by the infective agent; and not the least suggestive feature of the recent advance in our knowledge of malignant disease from the brilliant researches of Gye and Barnard is the importance of this internal factor in the production of the disease. In short, specificity of the soil looms as large as specificity of the infective agent.

From another point of view this concern of medicine for the individual man—his resistance—his qualities which make for good and for evil, pushes disease back to its beginnings. We thus become concerned with the fascinating though difficult study of trends and tendencies, with the border country between the physiological and pathological, and this leads one to reflect that the limits of the physiological widen with the advance of civilisation. And the body, like the mind, has its inborn traits. Physiological habit corresponds to character. Who is to say where peculiarity ends and fault begins? Advancing age tends to harden peculiarity into fault. Moreover, what we view as peculiarity in ourselves we are apt to term fault in other people. Thus determination becomes obstinacy, and strong will becomes self will, and conviction becomes obsession; and the latter suggests that the philosopher will make his convictions merry, so that his old age may possess content. On the physical side let me instance essential hypertension; no doubt this is sometimes an acquired condition, but equally often it is an inborn, a physiological habit, an over-responsiveness of the vaso-constrictor mechanism which begins as a peculiarity and may end as a fault or disease, commences in the realm of the physiological and ends in that of the pathological. The irritable heart, the over-responsive abdomen are other examples. Our object should be to take cognisance of habits and trends, and so guide their human possessor that his potentialities operate for his good, not for his harm.

THE RÔLE OF THE FAMILY DOCTOR.

Here, then, there is contact between medicine and education—their spheres overlap, their needful aptitudes resemble. The qualities of mind needed in a diagnostician are as essential to the teacher as the doctor. And from this I am led to reflect that teaching will become a prescribed duty in the doctor's career. How can it be otherwise? If we are to get to the beginnings—if we are to guide people in the ways of health, if the community guards the health of its mothers, its babies, its school children, its industrial workers, the family doctor must become an educationist and in part a health administrator.[1] If he does not, his rôle will suffer progressive diminution, curtailed as it will be on the one hand by the whole-time health official, and on the other hand by the invading specialist. This will, in my judgment, be a disadvantage to the community. The family has need of its own doctor, known and trusted, and it is with his guidance its members should get all that is best from specialism, and this is the more necessary in a day when specialisation begins early in the doctor's career and is apt to become restricted in vision. The family doctor should remain the foundation of medical service, but his outlook, functions, and training need modification to meet changing needs. First must come his care of the sick, but beyond that he will have communal and educational duties.

Take, for example, the value of medicine towards industry, the physical fitness of the worker, the survey of his environment, the gauging of the suitability of body and temperament to the work required, the strains connected with specialisation, and that new large field of research into the problems of industrial fatigue. In all these things, which concern not only the health and happiness but the efficiency of the worker, medicine has responsibility. Few doctors in a community could fulfil the whole range of such demands. I suggest that in the future the doctors of a district will form themselves into a "faculty" which would place the varieties of knowledge and experience of its members at the service of the community, and in its collective capacity exercise a powerful and much-needed influence on public life.

Withal let us do nothing which would impair the personal touch—the deep and abiding interest which mean so much in the hour of sickness, for our rosary needs to be strung with the beads of love as well as with those of thought.

THE HOSPITAL: PRESENT AND FUTURE.

How, then, are the members of this local faculty to hold high their standard of work? The answer is, by the hospital. Every district, however rural, should have a hospital adapted to its needs. For myself, I should like to see the conception of such a hospital widened to that of a health centre where curative work, clinic, wards, communal services, educational facilities could find a home, where doctors could improve their minds, give of their best, and find encouragement and restraint. And in this connexion is to be found one of the most beneficent activities of this illustrious College. This larger view of the district hospital carries with it a wider conception of the art of healing. Dietetics, physiotherapy belong as much to education as to healing.

With greater knowledge we have come back to simplicity. The surgeons first found salvation in fire by the discovery of asepsis, and the rest find in air and light a romance of healing. Who would have thought a few years ago that the simplest of hospitals, built on the cattle-byre type, with open air, sun, good food, aided by a knowledge of anatomy and physics as their only armamentarium, would have produced the transformations to be found in modern orthopædic hospitals?

And the beneficial results extend far beyond the patients cured, for each one of the latter becomes a missionary of health—a nuisance to his family, in that he enforces upon its members light and air, to their surprise, discomfort, and salvation. For one cured, many are saved; which dictum is further emphasised in the hygiene of the mouth, for the

[1] The considerations here set forth are apposite to the misgivings which have found expression in Parliament and the press on the attitude of our General Medical Council towards professional conduct and unqualified practice. Though these misgivings are for the most part based on misapprehension as to what medicine should stand for, they none the less need to be fathomed and adjusted in a large-minded spirit.

treatment of oral sepsis has done even more by its terrors than its cures.

HORMONES.

Next, may I let chemistry lead me to another line of thought. The discovery of hormones by Starling gave to chemical products a direct control of function. Consideration of the rôle of these chemical messengers, of which CO_2 may be said to be the exemplar, gives us a wider comprehension of the wisdom of the body, and the physical scope of, say, secretin and insulin is within our ken and gives clearness to our conceptions and range to our activities. But that minute quantities of a chemical product, the output of a group of cells, should so far be the arbiter of the physical and mental states of the body that its presence will decide whether the body is to have, or not, vigour and beauty, and the mind power to think and remember, leaves one almost dazed with wonderment. And yet—so it is, as the isolation of the active principle from the thyroid gland exemplifies. Again, it would seem that secondary, and to less extent primary sex characters are the result of chemical substance originating in specialised groups of cells, and such bodies not only determine sex at the outset, but will change sex characters during life's progress; and with the bodily changes will be the corresponding modifications of mind and character, and if one goes one step further and contemplates the beautiful attributes of the mother instinct, which have inspired the art and religion of the world, as resulting from stimulation by a chemical product, are not the limits of our comprehension passed, and our minds unsatisfied? Is the hormone the influence itself or the embodiment of the influence? Or is it the physical counterpart of the spiritual quality of influence? There are, in both, the same qualities of subtle and reiterated effect; in both of them we get a detachment from the material conception of mere bulk and weight and our minds glide back to the "little leaven" and "the grain of mustard seed." The rôle of the infinitely small carries thought to the border country of the material.

THE PLACE OF PSYCHOLOGY IN MEDICINE.

From this it is but an easy step to my next theme—viz., the place of psychology in medicine, which term I take to signify the study of the mind in health and illness. This must claim more of our attention, partly because the knowledge of mind has made striking advance and partly because the need for its help increases. And psychology needs to be taken into the texture of medical practice and not regarded as an extraneous aid. Its delicate processes, requiring as they do insight and sympathy, find encouragement and balance if they are as the warp to the woof of physical symptoms. Standing apart, psychological practice may easily fail in acceptance and purpose and even produce antagonism. This is due in part to the outlook of patients and in part to the crudity of many of its exponents. Broadly speaking, patients regard disturbances of mind as things they can, and disturbances of body as things they cannot, avoid.

Although neurosis is equally if not more prone to attack the higher type of mind, its diagnosis is apt, in spite of every explanation, to debase the patient and prejudice cure. So it happens that the physical and psychical should, wherever possible, be handled together. Priority of presentation should be given the physical, and it should be remembered that the disturbed mind is often helped best by treatment which is incidental and even unwitting. This is only another way of saying that the finer thoughts and feelings may be killed by attempts to give them a too concrete form. And yet, by a strange irony, there is a school of psychological medicine, earnest in advocacy, which has presented us a picture of the human mind and its processes, so crude and unattractive as to prejudice the acceptance of the great and valuable learning on which it is based.

For in truth, medicine owes a great debt to those teachers, Freud and others, who have disclosed to us the workings of the unconscious mind and their relations to those of the conscious. The principles of these teachers are not less true because the latter overstressed the rôle of the sexual instinct, and their disciples have mistaken the wood for the trees. And the conditions of modern life, its speed, its complexities, the fact that mechanical invention has outstripped man's power of adaptation, must not only produce exhaustions but set up strains, conflicts, and make the mind enter more into the make-up of illness than in the placid days of yore. And so it happens that not only do neuroses become more common, but physical illness is apt to be overlaid and inter-threaded with troubled states of mind. Clinical values have changed. And the vagaries in the manifestation of disease which so often vex its unravelling are sometimes the result of mind reactions—of personality.

How often do we not find that an illness with a physical basis which is perhaps amenable best to surgical interference, may have a superstructure of functional disturbances due to present or buried mental experiences, not only perplexing the patient and doctor but prejudicing recovery. Thus is explained why some operations cure the condition but not the patient. It is an interesting reflection that, while on the one hand the technique of diagnosis is growing in range and reliability, on the other hand the problem before it grows in complexity. This tells us that laboratory technique, though essential, is not all-sufficient; it throws light on the morbid process but not on the reaction of the latter with the patient. It leaves individuality untouched, unless, as is possible, variations in biochemical reactions may in the future disclose a correspondence with variations in bodily and mental functions.

PSYCHO-THERAPY.

I will next refer to the handling of the mind factor in disease. For reasons I have given, the technique of psycho-analysis, suggestion, and hypnotism, though in specially skilled hands and in exceptional cases useful, are in general medicine seldom necessary or desirable. The mind cannot, like the body, always stand set and formal treatment, for the texture and interlacing of the threads of its web are too delicate. Exploratory operations on the mind do not always heal by first intention. The best treatment often lies in comprehensive diagnosis, and by that I mean the unravelling and exposition, not only of the nature of the morbid process, but the physical and mental states associated with it.

Sort out a patient's symptoms for him. It is not things, but the significance of things which matters. Discomforts ignored in health are liable in neurosis to become obtrusive and produce fears. Such may impede the cure of bodily illness; or a function may be raised in consciousness; or again, a conscious experience may be misinterpreted and assume a sinister significance; or again, exhaustion may lessen control so that an instinctive tendency naturally suppressed rises up and produces conflict. Such factors must, in my judgment, contribute increasingly to the make-up of illness and demand our recognition. Explain causes, dissolve doubt, and, side by side with the best physical treatment, restore perspective, and the path to recovery and contentment opens out. An important part of therapeutics is a willingness to listen, a perceptive, understanding mind, and lucid persuasive exposition.

To those who have now been received into your Fellowship may I offer my felicitations and good will. A great heritage and an inspiring outlook are theirs—quest of knowledge, the beauty of craft, the privilege of help and healing, the leadership of their communities towards increasing health and contentment. As between nations medicine stands for reason, forbearance, and mercy, and with the English-speaking peoples it is a beacon light showing the way to closer understanding and the unity of an ever-deepening friendship.

ON SOME NEW METHODS, DEVICES, AND APPARATUS FOR THE ROUTINE AND THE RESEARCH LABORATORY.

BY SIR ALMROTH E. WRIGHT, M.D., F.R.S.,
PRINCIPAL OF THE INSTITUTE OF PATHOLOGY AND RESEARCH, ST. MARY'S HOSPITAL, LONDON, W.

OF recent years a signal change has come over the spirit of medicine. It is not very long ago since the thoughtful physician believed that the methods of clinical observation and physical exploration would conduct him to his goal, and believed further that it was no part of his office to explore in his patients the biological events which lie outside the ken of our unaided senses. In contrast with his predecessor, the physician of to-day realises that direct observation and physical exploration cannot lead him far, and that he must, for the understanding of his cases, rely very largely upon *laboratory methods*—meaning here by *laboratory methods* all procedures, whether applied in the laboratory or ward, which render manifest things that are imperceptible to our unaided senses.

Medical research has passed through a precisely similar evolution. The earlier research worker was content to restrict his observations to the data furnished by the unaided senses. Pasteur, for example, in his immunisation work, took cognisance only of phenomena such as the survival, sickening, and dying of inoculated animals. In other words, he was content to employ the method of the *saltus empiricus*—the method by which we overleap all intermediate and "*subperceptible*" events to a final result which becomes visible to the eye. Since that the research worker has been learning his lessons. He has learned that only very few problems can be resolved by the method of direct observation. He has learned, further, that problems which have been resolved by this method (let us think here, for instance, of small-pox vaccination) have been only quite superficially resolved. And he has learned, lastly, that the intimate mechanism of things cannot be laid bare except by resort to appropriate laboratory methods.

Herein lies the justification for the publication of new laboratory methods, devices, and apparatus. Inasmuch as it is this latter which must first be taken into account, the description of the procedures in the following will in each case be prefaced by explaining how the necessary apparatus is made.

COVER-GLASS CELLS.

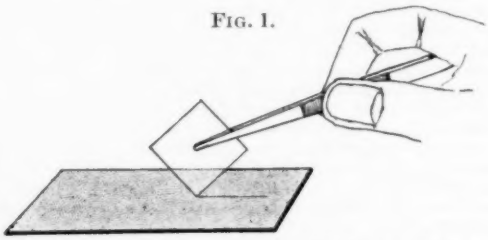
For the proper display and enumeration of such elements as red and white corpuscles, or microbes, or bacterial colonies growing in fluid, we require in each case to have at disposal shallow cells of standard depth. The hæmocytometer, of course, provides such a cell, and so does the slide-cell described in a previous paper.[1] The hæmocytometer has the grave defect of being expensive. Further, in the hæmocytometer cell the depth of fluid cannot be altered to suit different requirements. And, again, the hæmocytometer cell does not lend itself to sterilisation and to conversion into a culture chamber such as is required in connexion with measurements of bactericidal power. The slide-cell, though it provides ideally convenient culture chambers, falls short in the respect that its lid, made as it is of a microscopic slide, does not allow of the examination of the contents of the chambers with high magnifying powers. With a view to remedying these defects of the hæmocytometer and the slide-cell the cover-glass cell was devised. It is designed upon the very simple principle that a known volume of fluid spread out under a cover-glass of known area will, if the escape of fluid from under the cover-glass is prevented, give a layer of fluid of known and (assuming that the cover-glass and slide are nearly flat) of approximately uniform depth.

[1] THE LANCET, 1923, i., 365.

The Simple Cover-glass Cell.

Here the escape of fluid from under the cover-glass is prevented by coating the edges of the cover-glass with vaseline. The device for applying the vaseline to the edges of the cover-glass is to place a very small pellet of vaseline upon a slide and then melt this down by heating the glass. While the vaseline is still liquid we grasp a cover-glass in a pair of fine forceps and trundle it upon its edge over the surface of the vaselined slide in the manner indicated in Fig. 1. When a cover-glass thus edged

FIG. 1.



Showing how the edges of a cover-glass are coated with vaseline by trundling it over the surface of a hot vaseline-covered slide.

with vaseline is imposed on a drop of fluid we have made what we may call a *simple cover-glass cell.*

Hinged and Walled Cover-glass Cell.

A second form of cell—better in the respect that it can be used both as a counting and a culture chamber—is the following.

Method of Construction.—A microscopic slide is carefully cleaned and is passed through the flame to sterilise it. A cover-glass is similarly prepared. The latter is laid down upon the slide. With a soft paint-brush melted vaseline is now painted round its edges, the vaseline being allowed to overlap the edges to the extent of a millimetre or two. One of the corners nearest the worker is left unvaselined to facilitate lifting the cover-glass (Fig. 2, A). We further require to make a hinge upon which the cover-glass can be flapped up and down without lateral dislocation. That hinge is provided by thickening the vaseline rim and allowing it to overlap a little more along the edge which is farthest from us.

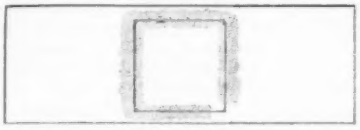
When the time comes for filling the cell a thin knife blade is inserted under the bare corner of the cover-glass lid, and this is lifted up until it stands upright upon the hinge that has been constructed (Fig. 2, B). The prearranged volume of fluid is then filled in from a pipette which has either been paraffined at the tip or has been drawn out into a fine point. If the fluid in question is blood, or any suspension in which the solid particles bulk as largely as they do in blood, not less than 30 c.mm. should be filled into the $\frac{3}{4}$-inch cover-glass cell, so as to provide a sufficient depth of fluid, and the fluid should be deposited, not as a solid drop in the middle of the floor, but in the form of a ridge running out at right angles from the middle of the hinge. If these precautions are observed and the cover-glass lid is let down very slowly upon the fluid, an uneven distribution of the corpuscles or other suspended material will be avoided. When the cover-glass has been let down upon its bed the cell is sealed up by painting additional vaseline round its edges (Fig. 2, C) We may call the sort of cells we have been here speaking of *hinged and walled cover-glass cells.*

The simple cover-glass cells may be employed as *counting chambers* for the enumeration of red and white corpuscles or bacteria.

The hinged and walled cells are used: (*a*) As *bacterial culture chambers.* Such chambers find useful application: (*a*) when we want to count

the living, as distinguished from the total bacterial content of a culture, or to count the living microbes in a quantum of culture used for a bactericidal experiment; (*b*) where we want to discover whether a particular microbe can cultivate itself in blood or any other medium; or to determine whether an addition, and if so, what addition, of a vaccine or other chemical agent will impede or abolish such growth.

FIG. 2, A.

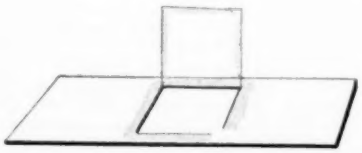


Vaseline hinged and walled cover-glass cell. The cell before opening.

(*b*) As *emigration chambers*—for the procuring of cover-glasses carpeted with, or of cells covered roof and floor with, leucocytes obtained direct from the blood.

The methods of employing the cover-glass cell for these several purposes may now be very briefly described.

FIG. 2, B.



The cell opened for filling, showing the cover-glass standing upright upon the vaseline hinge.

Enumeration of the Red and White Corpuscles.

(1) Blood suitably diluted with 8 per cent. magnesium sulphate coloured with methyl violet is introduced into the cell in the manner previously described. The appropriate magnesium solution is a saturated solution five-fold diluted to which about one-tenth of a 1 per cent. solution of methyl violet in water has been added. For counting leucocytes a dilution of 1 in 50 of blood and for red corpuscles one of 1 in 500 will give convenient counts. These dilutions are made on a paraffined slide with a paraffin-tipped pipette in the manner described in the author's "Technique of the Teat and Capillary Tube."[2] A suitable cover-glass to use is one 20 mm. (¾ inch) square—i.e., one with a superficial area of 400 sq. mm. Forty c.mm. of the diluted blood may be put into a cell of this size, giving a depth of 0·1 mm. If the cover-slip is not exactly 20 mm. square a correction must be applied in the calculations. When the above-mentioned quantum of diluted blood has been measured into the cell the lid is closed down, and the preparation is now placed under the microscope fitted with either a high-power dry or an oil-immersion lens. The diameter of the field which this lens gives when employed with the selected eye-piece must have been previously determined by measurement with a stage micrometer. For the purpose of an enumeration the number of cells red or white in, let us say, 10 or 20 fields is ascertained and an average is then struck.

FIG. 2, C.

The cell reclosed after filling.

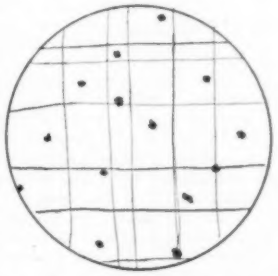
The calculations come out very simply. Let us suppose, for the sake of illustration, that our data were as follows. *Diameter of the field of vision of our lens combination*, 0·8 mm. *Superficial area of that field of vision* (arrived at by squaring the diameter and multiplying by 0·785), 0·5 sq. mm. (approximately). *Depth of fluid in the cell* (supposing 40 c.mm. of fluid to have been filled into a cell of 400 mm. superficial area), 0·1 mm. *Volume of diluted blood in the field of the microscope*, 0·05 c.mm. *Volume of undiluted blood in the field of the microscope* (assuming the blood to have been diluted 50-fold), 0·001 c.mm. And now, assuming that the average number of leucocytes per field had worked out as 7, the figure for the number of leucocytes in 1 c.mm. of blood would work out as 7000.

The method of calculation is similar for a red corpuscle count, except that here allowance must be made for the ten-fold greater dilution of the blood. When the cell is used for the enumeration of the microbes the procedure is similar to that used for counting corpuscles.

PROCEDURE FOR THE ENUMERATION OF MICROBES.

(2) Progressive dilutions of the culture are made (salt solution, broth or diluted serum being used as the diluent) and then the most suitable dilution (it will be one which furnishes only a very few microbes in the field of the oil-immersion field) is chosen for enumeration. Certain special difficulties, however, present themselves when we try to focus down upon small unstained objects when present in only very small numbers in a water-clear medium. Let us carry in mind here that we have in the oil-immersion lens the equivalent of an extremely myopic eye which possesses only a very shallow depth of focus. Further, let us reflect that when we are focusing down upon a preparation such as we have here in view there is nothing to give us warning (unless by special providence a microbe happens to lie in the exact axis of vision, and that does not count as adequate warning); there is nothing, I resume, to notify us of our having arrived at the upper delimiting plane of our fluid, and again nothing to give us warning of our having arrived at the bottom of our layer of fluid. In default of such guidance we can hardly fail to focus either too high or too low. And focusing too high means failing to see our microscopic objects, and focusing too low means in addition ruining our preparation.

FIG. 3.



Microbic colonies in the field of the microscope, enclosed between two systems of striæ—the vertical striæ being on the lower face of the cover-glass and the horizontal on the upper surface of the slide.

These difficulties can be overcome by the adoption of a very simple device. We take a piece of very fine emery paper (the kind that is described in the trade as 00), and making firm pressure upon this draw it once longitudinally over our microscopic slide. That done we take our cover-glass and lay it down upon the emery paper, and pressing firmly down upon it with the finger, move it over the paper for the distance of about an inch. This gives us two sets of parallel striæ—one upon the upper surface of the slide, the other on the lower surface of the cover-glass. We now in constructing our cell impose the striated face of the cover-glass upon the striated face of the slide, and we take care to dispose the striæ on the cover-glass at right angles to those on the slide (Fig. 3). As we focus down upon such a cell, the vertically disposed scratches on the cover-glass will, of course, come first into view, and on focusing down further the longitudinal striæ on the slide. Between these two delimiting planes we shall find our microbes. Our counting will be facilitated if we use only a small depth of fluid in our cell. Not more than 20 c.mm. of fluid should be employed for a 20 mm. square cell. And it is convenient to use even less than this, provided always that this can be done without entangling bubbles in the fluid. In point of fact the

[2] London: Constable and Co. 1921.

avoidance of these is much facilitated by the circumstance that we are here operating not with smooth but with scratched glass surfaces.

EMPLOYMENT OF THE COVER-GLASS CELL AS A CULTURE CHAMBER.

(3) When the cover-glass cell is used as a culture chamber for counting living microbes it is, of course, requisite to employ a nutrient medium in which the microbes can grow out rapidly into colonies. When dealing with serophytic bacteria we may conveniently employ serum, or diluted serum or blood diluted with three times its volume of water. When the culture in progressive dilutions has been implanted into one or other of these media, appropriate volumes are measured into a series of cover-glass cells and these are sealed up and placed in the incubator. After they have been there for 24 hours they are taken out and examined. When a sufficient depth of nutrient fluid has been employed in the cell (for example, when 30 or 40 c.mm. of fluid have been introduced into a ¾-inch cover-glass cell) the colonies when few in number will be sufficiently large to count with the naked eye. When the colonies are more numerous they can be enumerated with a hand-lens—the enumeration being facilitated by ruling with a grease pencil a pattern of squares upon the lower surface of the slide. When the colonies are more numerous still, or when they have remained very small (as will happen when only a very shallow layer of nutrient medium has been provided) (Fig. 3) enumeration is carried out under the microscope by the procedure which has been described in connexion with red and white blood corpuscles.

Inasmuch as the cover-glass cell in the capacity of a culture chamber finds application in particular in connexion with measurements of the bactericidal power of the blood, the procedure for making these measurements may be very briefly described. It consists essentially of two operations. In the first, measured volumes of the diluted culture are added to blood and then in each case aliquot portions of this implanted blood—conveniently 40 or 50 c.mm.—are introduced into a series of cover-glass cells—taking care when introducing the blood into the cells to spread it out, as described above, in the form of ridge at right angles to the middle of vaseline hinge. The cells are then sealed and placed in the incubator. In the second operation the self-same quantities of culture are implanted into either serum or hæmolysed blood, and again similar volumes of these media are introduced into another series of cover-glass cells, and are placed in the incubator. And, finally, after 24 hours the colonies in the companion cells are counted, and the results are expressed in the form of proportion sums.

EMPLOYMENT OF THE COVER-GLASS CELL AS AN EMIGRATION CHAMBER.

(4) The cover-glass cell furnishes also a very convenient emigration chamber—in other words, we can employ it for obtaining a cover-glass carpeted with living leucocytes, or if we happen to want this a cell which is both floored and roofed with these elements. All that requires to be done is to fill the cell with blood—60 c.mm. is a convenient quantity—and to impose a cover-glass upon the blood while it is still unclotted. The cell is now placed in the incubator for a shorter or longer period; for a shorter period, if we want a thin carpeting consisting exclusively of polynuclears; for a longer, if we want a thick carpeting with an admixture of mononuclears. For the former purpose 20 to 30 minutes; for the latter 45 minutes will amply suffice.

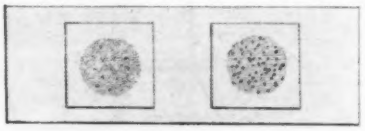
METHOD OF OBTAINING A PERMANENT RECORD OF BACTERICIDAL POWER OF BLOOD.

When it is for any reason desirable to keep a permanent record of measurements of the bactericidal effect exerted by a sample of blood the following requirements must be satisfied. The blood with its implanted microbes must be incorporated into some texture which will keep these micro-organisms separate, and will allow of the survivors growing out in its interstices. Further, the containing texture must be one in which the colonies can be rendered conspicuous by staining while it itself fails to hold the stain. These conditions are fulfilled by filter paper, and upon it colonies of staphylococcus or streptococcus, stained by Gram's method (or of tubercle bacillus stained by Ziehl-Neelsen), stand out in good contrast. Care must be taken with the sterilisation of the filter paper. This should be carried out by heating in the dry steriliser for ten minutes at 120° C. If a longer time or a higher temperature is employed the absorbent properties of the paper may be impaired.

Method of Procedure.

The procedure is as follows. We take a measured volume of serum, plasma, or blood (100 c.mm. is a suitable amount) and mix with it on a paraffined slide a measured volume of a suitable dilution of a microbic culture. Into this implanted blood, plasma, or serum we now immerse a disc of sterile filter paper. When it has impregnated itself with the fluid we transfer it to a sheet of sterile paper and so get rid of any excess of fluid. That done, we transfer the disc to the surface of a sterile slide, cover it with a sterile cover-glass, then paint melted vaseline round the edges so as to prevent desiccation, and then put away for 24 hours (or if we are dealing with the tubercle bacillus for a week) into the incubator. After that the cover-slip is removed and the specimen is placed in water, the soaking being continued until the albuminous substances of the blood fluids have soaked out and the hæmoglobin has been completely extracted. We then, in the ordinary case where we are dealing with either staphylococcus or streptococcus, stain by Gram's method, continuing the decolorisation until the colonies stand out as dark violet spots upon a perfectly white background. Where we are dealing with the tubercle bacillus we, of course, stain with boiling carbol-fuchsin and decolorise with sulphuric acid. Finally, in either case we dehydrate in absolute alcohol, then remove the alcohol by pressure between filter paper, soak for a minute in xylol, and then mount in Canada balsam (Fig. 4).

FIG. 4.



a *b*

Showing microbic colonies stained in filter paper, the filter paper being impregnated in *a* with hyper-leucocyted in *b* with hypo-leucocyted blood.

METHOD OF REMOVING LEUCOCYTES FROM BLOOD.

The emigration cell, described in a previous section, renders service by providing us with isolated leucocytes obtained from the normal blood such as are required for the investigation of the bactericidal power of these elements. In order to obtain counterpart experiments with blood deprived of leucocytes, it was requisite to find means to remove the leucocytes from blood. It turned out that this can be very simply achieved by passing defibrinated blood through even one thickness of filter paper. This filtration procedure furnishes, in addition to a supply of filtrated blood, also filter paper whose upper surface is crowded, and whose lower surface is almost bare of leucocytes. Thus such filter papers furnish us with the means of making comparative bactericidal experiments with what we may call *hyper-* and *hypo-leucocyted* blood—i.e., blood which is very rich and blood which is very poor in leucocytes.

To conduct such experiments we take discs or squares of sterilised filter paper, impose them upon a paraffined slide, and then using the heated handle of a metal scalpel as a flat-iron we iron down the

edges of the papers upon the slide in such a manner as to impregnate these edges with paraffin. The border of paraffin which is in this way obtained serves to keep the blood when this is imposed upon the filter discs or squares from running off upon a subjacent surface. Our paraffin-framed discs or squares are now transferred to a sterile sheet of filter paper which is destined to supply the aspirating force required for our filtering operations. Everything being now prepared, we impose defibrinated blood upon our filters heaping it up upon them, and we now take care to bring the upper and lower filter papers into closer application so as to start the filtration. In filtering care must, of course, be taken to prevent any portion of the filter running dry.

That a filter paper which has served for the filtration of blood contains in its superficial layers practically all the leucocytes of the blood, and in its deeper layers practically no leucocytes can be very easily demonstrated. We can satisfy ourselves of this by taking such a filter paper, treating it with water until all the hæmoglobin has been dissolved out, staining with logwood, mounting in balsam, and examining under an oil-immersion lens.

For the purpose of a comparative bactericial test we prepare two such discs (Discs Nos. 1 and 2), also soak another precisely similar disc in serum (Disc No. 3), and then take a Petri dish containing nutrient agar, the surface of which has been evenly implanted with staphylococci. Then we place Disc No. 1 upper face downwards upon the agar; Disc No. 2 lower face downwards; and Disc No. 3 any way that it happens to come, and then cultivate at 37° C. for 24 hours. By that time all the microbes which have escaped destruction will have grown out into colonies, and will have invaded the substance of the filter paper discs, and inspection of these, beginning with the last and ending with the first mentioned, will show (1) that the serum has exerted no bactericidal power, (2) that the hypo-leucocyted blood has exerted very little bactericidal effect, and (3) that the hyper-leucocyted blood has exerted a very great deal. Permanent show specimens can now be prepared by first soaking the filter papers in water, then staining by Gram's method, and then mounting in Canada balsam (Fig. 4).

THE VAGINAL PIPETTE.

The vaginal pipette serves for evacuating the contents of lengths of capillary tube which are unprovided with mouthpieces—for example, stems of capillary pipettes which have been cut off from their butt ends.

The principle upon which the pipette is constructed will be understood from the description of the method of making such a pipette. We take a capillary pipette with tapering stem, and cut this down to a length of about 3 inches, and then again cut it across just below the neck of the pipette. We then coat the middle of the truncated stem somewhat heavily with sealing-wax, and heating the neck of the butt end in the flame we bring it down over what was previously the distal extremity of the capillary tube until it meets the sealing-wax. This lutes the two tubes together, giving us an inner tube with a trumpet-like aperture and a tapering upper end, and an outer tube upon which we can fit a rubber teat. When we now introduce into the pipette's trumpet-shaped mouth the tapering end of any open capillary stem, and push it home until grasped by the contracting walls of the tube, we obtain a practically air-tight joint (Fig. 5). When such an air-tight joint has been obtained pressure on the teat will expel the contents.

This description of the vaginal pipette may conveniently introduce an account of procedures in which it finds useful application. The first of these is a

Simplification of the Procedure for Measuring the Phagocytic Power of the Blood, or, as the case may be, the Phagocytic Efficiency of Leucocytes, or the Opsonic Index.

The technique here to be described departs from that set out in the author's "Technique of the Teat and Capillary Tube" in the respect that after the phagocytic mixtures have been made and filled into the capillary pipettes and the tips of these have been sealed, the stems are cut off from the butt ends and are then immediately or after a very short incubation in the water-bath centrifuged. After a centrifugalisation, which may last on the average some 45 seconds, the tips of the pipettes are cut off, the contents are expelled and mixed by the aid of the vaginal pipette, and films are made in the customary manner. In a future communication the details and the advantages of this procedure will be fully described.

Simplification of the Method of Measuring the Coagulation Time of the Blood.

The method here to be described is a simplification of the methods described in the first and second

FIG. 5.

FIG. 5.—Vaginal pipette.

FIG. 6.

FIG. 6.—Coagulation tubes fixed on a roll of plasticine. The left-hand two are depicted empty except for the paraffin lining in their upper tapering ends. The right-hand two are shown with the columns of blood in position.

editions of the author's "Technique of the Teat and Capillary Tube." We take a number of capillary tubes of approximately equal calibre and dip their distal ends into thoroughly liquefied paraffin wax, allowing this to run up the tubes to a distance of about 1½ inches. The bulk of the paraffin is then blown out, leaving us with a set of capillary tubes whose tapering distal ends carry a lining of paraffin. We now cut off the stems some 2 to 3 inches above the upper border of the paraffin lining (Fig. 6). The tubes—let us now call them *coagulation tubes*—are then arranged palisade fashion, but not too closely together, upon a roll of plasticine with their paraffin ends disposed upwards and the paraffin lining projecting both a little above and a little below the plasticine. Blood is then obtained by puncturing the finger and is allowed to drop on to a paraffined slide. The non-paraffined ends of the coagulation tubes are now approximated and are dipped into the blood. When this has run up each tube to the distance of about 1½ inches the inflow is arrested and the tubes are inverted so as to allow the blood to gravitate down in the direction of the tapering paraffined ends. The tubes are now immersed, paraffined ends upwards, in a jar of water standing at 37° C., the plasticine roll to which they are connected being affixed to the side of the jar just above the water. It will now be found that the paraffined lining as applied to the tapering end of the tube effectively counteracts the upward pressure of the water with the result that the columns of blood now remain fully immersed. When the time for investigating the condition of coagulation in each successive tube arrives the contents of that tube are, by the aid of the vaginal pipette, blown out into the surrounding water.

IRRADIATION OF FOODSTUFFS WITH ULTRA-VIOLET LIGHT.

A CLINICAL INVESTIGATION OF THE CURATIVE VALUE OF IRRADIATED FOOD IN RICKETS.*

BY HELEN M. M. MACKAY, M.D. LOND., M.R.C.P.,

PHYSICIAN TO THE QUEEN'S HOSPITAL FOR CHILDREN; AND ASSISTANT PHYSICIAN TO THE INFANTS HOSPITAL, WESTMINSTER;

AND

HAROLD F. SHAW, M.B., CH.B. MANCH.,

SENIOR RESIDENT MEDICAL OFFICER, EAST LONDON HOSPITAL FOR CHILDREN; LATE HOUSE PHYSICIAN TO THE QUEEN'S HOSPITAL FOR CHILDREN.

ONE of the most interesting recent developments in medicine is the scientific study of the effects of light on the organism, its mode of action, and its therapeutic value in disease. The striking increase in well-being so frequently obtained from light treatment in this country appears to justify the conclusion that large numbers of city dwellers suffer from too little exposure to light, and that for this reason artificial light therapy has a wide sphere of usefulness. Its romance has caught the imagination of the public, a fact with attendant advantages and disadvantages, since on the one hand all have now heard of its value, and on the other there is the likelihood of exaggerated hopes leading to a reaction.

In artificial light therapy we are as yet only feeling our way, working empirically, with no clear idea of the relative value of different rays under different conditions, of the best dosage, or of how to grade it. The subject, too, is complicated by such phenomena as the interference of one group of rays with the effects of another.[1] Bit by bit, however, scientific knowledge is accumulating which will allow of a better understanding of the physiological effects of light. Two diseases—rickets and infantile tetany—are known to be directly associated with insufficient exposure to light, and consequently these lend themselves to investigation in connexion with light treatment—the former much more readily than the latter as its progress can be studied and demonstrated with the aid of the X ray plate; but knowledge developed in connexion with rickets will probably help our understanding of the mode of action of light in other conditions.

Therapeutic Effects Common to Cod-liver Oil and Ultra-violet Light.

For some time interest has been aroused by the curiously parallel action of light and cod-liver oil (containing the so-called antirachitic factor) in relation to calcium and phosphorus metabolism. Either will cure the bone lesions of rickets [2] and will prevent the development of rickets on a rachitic diet,[3] either will increase the availability (probably by increasing absorption from the intestine [4]) of calcium and phosphorus in the diet, making a very small quantity adequate for the needs of the organism, and either will bring about the gradual rise to normal of a low blood phosphorus or blood calcium.[5] Both cod-liver oil and light therapy will induce growth in a rat given a diet deficient in the fat-soluble vitamins (A factor and antirachitic factor), but the duration of growth differs. ½ cod-liver oil containing these factors is added to the diet growth *continues* normally, but the growth caused by exposure to light is only temporary. After an interval—i.e., probably when the supply of vitamin A (in contradistinction to the antirachitic factor) in the rat's body is exhausted—the animal rapidly develops xerophthalmia and loses weight.[6] On the other hand, a rat on a "rachitic diet" can be protected apparently indefinitely against rickets by exposure to adequate light, a fact which appears to indicate that the action of light and of cod-liver oil are only interchangeable as regards the antirachitic factor and not the A factor.

The Activation of Lipoids by Light: Animal Experiments.

Steenbock and Black [7] and Hess [8] were the first to correlate these facts, though many investigators are now working in this field. Steenbock and Black found that the presence of irradiated rats favourably influenced the growth of non-irradiated animals living in the same cage when all were on the same diet—namely, one deficient in the antirachitic factor. They suspected emanations of some sort from the radiated rats, especially since they found that an irradiated cage bottom exerted a similar beneficial effect. They worked with insulators, conductors, various metals enclosed in quartz flasks or exposed direct to the rats in their efforts to discover the nature of this emanation,[9] and finally the true explanation dawned on them and was confirmed by experiment. Exposure to ultra-violet light endowed certain foodstuffs with antirachitic properties. By irradiation of the cage bottom traces of fæcal contamination were rendered antirachitic, and these were consumed by the rats in the process of their toilet. Irradiation of the rats' total ration or of muscle, liver,[7] or vegetable oils [10] induced antirachitic properties in these substances, as evidenced by experimental work. Here, then, was part of the explanation of the identical antirachitic power of cod-liver oil and of light; the antirachitic factor which is present in cod-liver oil can be produced under the influence of ultra-violet light either in the living organism or in its foodstuffs. But so far it was not clear whether this "antirachitic factor" was a chemical entity or a form of radiant energy. Kugelmass's and McQuarrie's work,[11] suggesting that ultra-violet rays were given off by certain antirachitic substances when oxidised, has not been confirmed by other workers.[12] Now the explanation has been carried a step further. Under the influence of light two chemically pure substances, cholesterol obtained from animals and phytosterol obtained from plants, have been shown to acquire antirachitic properties,[13] and in the process cholesterol is changed in chemical constitution—in colour,[14] melting point,[15] and in its spectrum.[16] Moreover, the skin of an irradiated animal has antirachitic properties when fed to a rat on a rachitic diet.[14] Now the skin contains cholesterol (an alcohol). Cholesterol esters, formed from cholesterol and the fatty acids, are the main constituents of the secretion of the sebaceous glands. Presumably, therefore, both in the living animal exposed to ultra-violet light and in antirachitic foodstuffs, the antirachitic property resides in the cholesterol or phytosterol and possibly in other similar substances, and the animal is able to use this activated lipoid, whether it is supplied via the skin or the alimentary tract. Hess and Weinstock have demonstrated the antirachitic power of cholesterol when injected subcutaneously.[17] Ultra-violet light would seem to have no power of causing the development of fat-soluble A in the body, but only of the antirachitic factor; hence, irradiated rats given a diet deficient both in the antirachitic factor and in vitamin A only grew until their progress was arrested by the shortage of vitamin A.

The Authors' Observations.

Until August, 1925, little work on the effects on man of irradiated foodstuffs had been published. Cowell [18] states that the bone lesions of two children receiving irradiated cow's milk healed more quickly than those of his control on non-irradiated milk. Steenbock and Daniels favourably influenced the calcium balance of two apparently healthy infants by giving irradiated olive oil,[13] and Hess tested on rachitic children irradiated carrots, spinach, and dried milk, but gives few details.[14] During August, however, there appeared a paper

* A preliminary communication was made at the meeting of the British Medical Association in July, 1925.

by Kramer, who showed by means of X ray photographs and examination of the blood the curative value of irradiated cow's milk on eight young children.[19]

From February till July, 1925, the writers have been investigating the clinical value in the treatment of rachitic children of certain irradiated foodstuffs. The children under observation were in-patients at the Queen's Hospital for Children. All were in the same ward, which is well lighted by windows facing north and south and is well ventilated. Their ages varied from 7 months to 3½ years, and the chief facts concerning each child are summarised in the accompanying table. The diet in the main was the ordinary hospital one and varied according to the age and weight of the individual. Each child received a liberal allowance daily of full-cream dried milk (a spray process milk, Trumilk, was used); 3½ to 5 oz. were given, being equivalent to approximately eight times that amount of fluid milk. The diets were as follows:

Diet A.—Meat, soup, vegetables, pudding as ordinarily supplied from the hospital kitchen, bread, butter, jam, and fruit, with 3½ oz. of dried milk daily.

Diet B.—Soup, milk pudding, bread and butter, and 5 oz. of dried milk daily.

Diet C.—Dried milk, varying in quantity with the size and age of the child, sugar, and fruit juice.

The source of ultra-violet light was a mercury arc (mercury-vapour quartz lamp) of the Hanau type, made by the Hewittic Electrical Company, a vacuum lamp with a metal reflector, and a burner voltage of 140 (supply current 210 volts). In each case the food to be irradiated (24 hours supply) was placed for one hour under the lamp in a thin layer at a foot distance from the burner.

Results Obtained.

1. *Control Observations.*—Throughout the period of observation there were children in the wards on the same diets, but having no part of their food irradiated; six such cases were under observation for periods of five weeks upwards. One child (Case 9, A. K., aged 3½ years) was admitted in June with the rachitic lesions already healing, and they continued to heal after admission. This case, therefore, should be excluded from the series, leaving five controls. None of these showed radiographic evidence of healing without specific antirachitic treatment (see Cases 4–8 inclusive; Case 8 is discussed in paragraph 5 below).

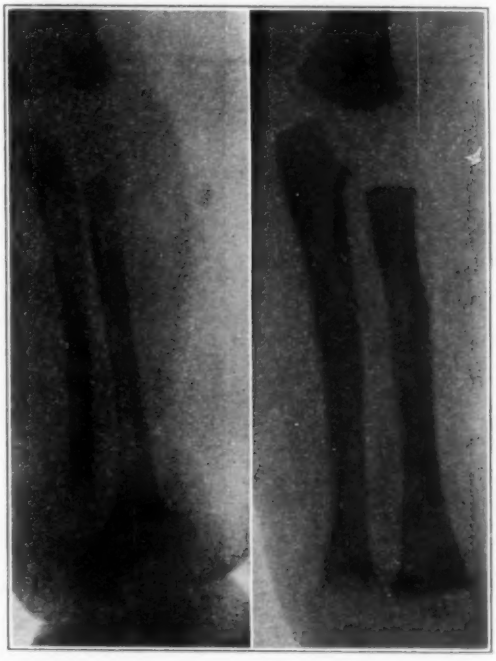
2. *Cases Treated with Irradiated Dried Milk (Rickets and Spasmophilia).*—Three children received irradiated dried milk, 3½ to 5 oz. daily. In one, the eldest, aged 3½ years (Case 1, J. E.), the milk formed only part of a mixed diet, which included meat and vegetables. All three children showed radiographic evidence of healing between the fifteenth and twenty-second day after treatment was begun (the photographs were taken at approximately weekly intervals), and in all there was steady progress in calcification. This was at a rate comparable to that usually obtained by direct exposure of the child to the light of the lamp or by administration of cod-liver oil by mouth. Moreover, in one child suffering from spasmophilia (infantile tetany) the condition was cured as it would be by direct radiation. This case is one of special interest. The child (Case 2, J. L., aged 7 months) had, on admission, frequent laryngeal stridor and a well-marked Chvostek reaction (contraction of facial muscles obtained by tapping the side of the face over the branches of the facial nerve). He developed pneumonia on the eighth day after admission, but this acute illness did not interfere with the cure of either his rickets or tetany. Craniotabes, which had been fairly extensive, had nearly disappeared by the seventeenth day, and all clinical evidence of spasmophilia by the eleventh to twelfth day.

3. *Cases Treated with Irradiated Dried Milk which was Subsequently Boiled.*—In order to test whether or not the antirachitic property induced by light in the milk would withstand the effects of cooking, two children were given irradiated dried milk, which, after being mixed with water, was simmered over a gas flame, the temperature being kept at boiling-point for ten minutes. Both these children (Case 4, F. B., aged 8 months, and Case 5, J. H., aged 18 months) (see Fig. 1) had undergone a preliminary control period during which there was no evidence of healing. The X ray plate showed the first signs of healing on the seventeenth and nineteenth day respectively after the boiled irradiated milk was first given. The antirachitic property thus induced will, therefore, withstand the effects of boiling.

4. *Case Treated with Irradiated Sweetened Condensed Milk.*—One child (Case 6, D. R., aged 18 months) (see Fig. 2) with severe rickets, as shown radiographically, received, after a preliminary control period, 5 oz. of irradiated full-cream sweetened condensed milk (Nestlé's) in place of dried milk. The same rapid calcification was brought about as in the five cases already described.

5. *Cases Treated with Irradiated White Flour.*—The results obtained with irradiated, white, wheaten flour were inconclusive, probably negative. The flour after irradiation was given uncooked, mixed with soup, gravy, or minced meat. It was well taken and evidently digested, since the stools showed few starch granules. E. M. (Case 7, aged 1 year 10 months) received 3 oz. daily with no evidence of healing. She was then given outdoor treatment and cod-liver oil by mouth, and healing was apparent in 20 days. The other case (Case 8, V. C., aged 1 year 10 months) was admitted on Feb. 4th. On March 11th the child had a single exposure to the light of the mercury arc, and eight days later there was radiographic evidence of healing. This slight calcification appeared unusually early, but the after-history supports, though it does not prove, the view that it was due to the exposure to the mercury arc. From March 26th to June 18th the child was given 3 oz. of irradiated flour daily, but after very slow progress for about a month showed little or no advance in calcification, until given outdoor treatment in June. There seems no doubt that the antirachitic power induced in the flour was feeble, if present at all.

FIG. 1. (*Case 5.*)



Moderate rickets—active. Radiogram taken April 8th, 1925.

Bone lesions healed after 3 months' treatment with irradiated dried milk which had been boiled for 10 minutes after irradiation. Radiogram taken Sept. 7th, 1925.

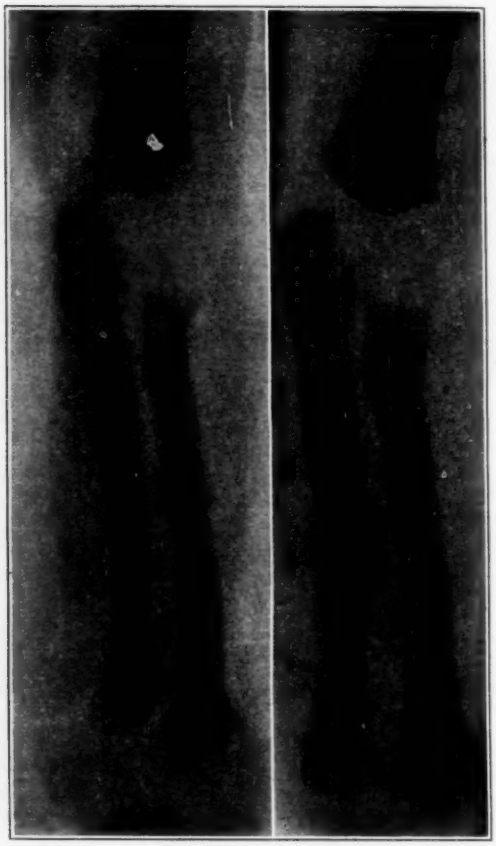
6. *Case Treated with Irradiated Cotton-seed Oil.*—Only one in-patient (Case 10, F. S., aged 15 months) received irradiated cotton-seed oil. He was given on the first day 1½ drachms, increasing by the seventh day to 6 drachms daily, the amount being given in three doses. Healing was apparent on the thirty-ninth day and progress in calcification was slow. Six drachms must be considered near the limit of tolerance for a young child, since this amount set up diarrhœa in several out-patient children receiving it. Taking this case in conjunction with the out-patients under observation, it is safe to say that the irradiated cotton-seed oil

certainly had not the potency of an average sample of cod-liver oil, but it would seem probable that 6 drachms exercised some curative effect, though more observations on in-patients would be necessary to establish this point.

Comments.

Experiments on rats have shown that both white flour and cotton-seed oil *can* be activated by irradiation and that a very small quantity (0·1 c.cm.) of the latter

FIG. 2. (*Case 6.*)



Severe active rickets. Radiogram taken July 15th, 1925. Bones were unchanged after 2 months' in hospital, in spite of good general progress.

Bone lesions nearly healed after 2 months' treatment with irradiated sweetened condensed milk. Radiogram taken Sept. 7th, 1925.

will exert a protective influence on rats on a rachitic diet.[20] The failure to obtain similar results with children may be due to the fact that the substances in the quantities given were ineffective, or only slightly effective, or that we overshot the mark by too prolonged irradiation. It has been shown that ultra-violet light first activates olive oil (half to five hours' exposure) but that prolonged exposure (e.g., ten hours) destroys this antirachitic power.[21] A similar effect has been obtained by Hess with pure cholesterol[14] which he found inert after four hours' exposure to the mercury arc, and prolonged exposure (17 hours) has rendered cod-liver oil inactive.[21] On the other hand, Steenbock and Black found cholesterol still active after 17 hours' exposure to the mercury arc,[21] a fact probably to be explained by the varying intensity of the lamps used. Hess states that two minutes' exposure to the mercury arc at one foot distance activated linseed oil.[20]

It is impossible to say from the small number of children treated whether the improvement in the general health obtained by giving irradiated milk is comparable with that obtained by giving artificial light treatment or only with that obtained by the administration of cod-liver oil, for in cases of rickets the effect of a therapeutic agent on the general health and on calcium metabolism does not necessarily show a parallel course. Light therapy usually improves the child's activity, muscle tone, and general contentment, in addition to bringing about normal calcium metabolism; whereas cod-liver oil administration brings about normal calcium metabolism, but has much less effect on the general health. Conversely improvement of the general health is not necessarily accompanied by healing of the bone lesions.

It would, however, seem reasonable to suppose that the effect in rickets of foodstuffs artificially rendered antirachitic by ultra-violet radiation would be identical with that of naturally occurring antirachitic substances, such as cod-liver oil. It is clear that many of the physiological effects of light—for instance, erythema of the skin and pigmentation, to take the most obvious examples—cannot be brought about by a foodstuff endowed with antirachitic properties.

Summary of Results.

Observations were carried out on the effect on rachitic children of foodstuffs irradiated for one hour at one foot distance from a mercury arc; 24 hours supply was radiated daily. Weekly X ray photographs were taken of the long bones of the children and the results were based on changes in the rachitic bone lesions as shown by the X ray plate.

(*a*) Five control cases not healing on admission showed no healing without specific antirachitic treatment. All were given full-cream dried milk.

(*b*) The following cases showed calcification of the bones at a rate comparable to that usually obtained by direct radiation or by the administration of cod-liver oil: Three children given 3½ to 5 oz. of irradiated full-cream dried milk. One child given irradiated sweetened condensed milk. Two children given irradiated dried milk which had been boiled for ten minutes after irradiation.

(*c*) Two children were given 3 oz. of irradiated white flour. One gave a negative result, the other result was inconclusive, probably negative.

(*d*) One child was given 6 drachms of irradiated cotton-seed oil. There was very slow healing of the bone lesions.

(*e*) One child suffering from infantile tetany was cured by irradiated dried milk.

The Future Value of Irradiated Foodstuffs.

Animal experiments have shown that two minutes' irradiation will activate linseed oil,[20] and that irradiated olive oil can be kept for at least a period of ten months,[21] and linseed oil six months,[20] and still possess antirachitic power. There is little doubt that when it becomes possible certain foodstuffs will be irradiated on a commercial scale. This cannot be done at present as, in order to prevent undesirable exploitation, the process has been protected by a patent, as was done in the case of insulin. Among the substances activated in greater or less degree by different workers are muscle, liver, skin, milk, butter, lard, egg yolk, crude casein, yeast, a variety of vegetable oils, including olive oil, coconut oil, cotton-seed oil, linseed oil, and corn oil, as well as various cereal substances, including wheat, wheat flour, Indian corn, corn starch, and rolled oats. It is obvious that only foodstuffs with keeping properties are likely to be treated on a large scale. The use of these by the greater public will depend largely on their price, and, for all but infants, on their taste. Few adults like the taste of dried milk, and, in the writers' opinion, irradiation for an hour makes it less palatable. The taste is changed even after two minutes' exposure at one foot from the mercury arc. If such a very short exposure will activate foodstuffs, the cost should not prove an obstacle. For premature infants and for those of poor digestive power it would be an undoubted

SUMMARY OF CASES TREATED WITH IRRADIATED FOODSTUFFS.

Case.	Age on admission (years).	Diet.	Control period in 1925.	Date treatment begun.	Nature of treatment.	Date radiographic healing observed.	General health.	Bone lesions as shown radiographically.
1 J. E.	3½	A	28/1 to 12/2	12/2	Irrad. dried milk. 3½ oz. daily.	26/2 (15th day)	Feeble and flabby on admis. Just able to sit up. Marked kyphosis. Massage; improved greatly. Gained 3½ lb. in 2½ months.	Severe rickets. Good progress. Discharged healed in 2½ m.
2 J. L.	7/12	C	—	17/3	Irrad. dried milk. 4½ oz. daily.	7/4 (22nd day)	Admitted with spasmophilia (laryngeal stridor) and craniotabes. Pneumonia 8 days later. No stridor or Chvostek after 11th to 12th day. Good gen. progress. Gained 1½ lb. in 1½ m. Craniotabes nearly disappeared by 17th day.	Mod. rickets on admis. Nearly healed in 6 weeks.
3 W. S.	9/12	B	—	17/2	Irrad. dried milk. 5 oz. daily.	5/3 (17th day)	Under weight; gen. condition good. Gained 1½ lb. in 1½ m.	Slight rickets, nearly healed in 30 days.
4 F. B.	9/12	C	21/3 to 5/5	5/5	Boiled irrad. dried milk 4½ oz. daily.	21/5 (17th day)	Pale child. Poor gen. progress in hosp.	Very slight rickets.
5 J. H.	1⁴/12	B	13/4 to 5/6	5/6	Boiled irrad. dried milk 5 oz. daily.	23/6 (19th day)	Small, fat, rather flabby on admis. Satisfactory progress. Gained 3 lb. in 3½ m. (1½ lb. in 1½ m. control period).	Mod. rickets. Good progress with treatment. Nearly healed in 2 m. (See Fig. 1.)
6 D. R.	1⁸/12	B	14/5 to 7/7	7/7	Irrad. sweetened condensed milk. 5 fluid oz. daily.	28/7 (21st day)	Small, but gen. condition fairly good on admis. Gained 2¾ lb. in 3 m. (1¾ lb. in 1½ m. control period.)	Severe rickets. Good progress with treatment. Nearly healed in 2 m. (See Fig. 2.)
7 E. M.	1¹⁰/12	B	11/3 to 8/5	8/5 18/6	Irrad. flour 3 oz. daily. Outdoor and cod-liver oil.	No healing 7/7 (20th day)	Fair condition on admis. Gained nearly 1 lb. control period. No gain in weight while having irrad. flour.	Slight rickets. No healing with irrad. flour for 42 days. Advanced healing after 4½ weeks' treatment with sunshine and cod-liver oil.
8 V. C.	1¹⁰/12	A	4/2 to 11/3	11/3 26/3 18/6	Single exposure to light of mercury arc. Irrad. flour 3 oz. daily. Outdoor.	18/3 (8th day)	Small, but well nourished on admis. Poor gain in weight in hosp.	Mod. rickets. 4/2 to 11/3, no healing. 18/3 to 28/4, very slow progress. 28/4 to 1/7, stationary. 15/7, advanced healing (1 m. out of doors).
9 A. K.	3⁶/12	A	3/6 to 2/7	2/7	Outdoor.	Healing on admis.	Small and backward, but well nourished and good colour. Gained 3 lb. in 1½ m. in hosp.	Severe rickets. Steady progress.
10 F. S.	1³/12	B	—	24/4	Irrad. cotton-seed oil 1½ dr. increasing to 6 dr. daily by 7th day.	2/6 (39th day)	Fat, flabby child. Gained 3½ lb. in 2 m. in hosp.	Slight rickets. Slow progress. Nearly healed after 2 m. treatment.

advantage to be able to give a milk preparation of good antirachitic potency. At present it is certainly desirable to give every artificially fed infant and many breast-fed infants cod-liver oil daily all through the winter, since ordinary foodstuffs, even breast milk, will not ensure protection to an infant living an indoor life and consequently getting very little ultra-violet light.[22] An inexpensive antirachitic dried milk would have obvious advaatages over daily cod-liver oil medication. Its use would, generally speaking, be required only in winter, since in London, for example, it is our experience that it is rare to find a case of active rickets in the late summer on any diet, as by that season increased exposure to light out of doors has established the normal process of calcification of the bones.

The authors, in conclusion, would like to place on record their gratitude for the constant help and coöperation they have received from colleagues in both the medical and nursing professions. Their particular and very sincere thanks are due to Sister F. Francis, who was responsible for the entire series of X ray photographs, to the ward sister, Sister D. I. Hook, and to Sister M. W. Westbrook, who daily carried out the irradiation of the foodstuffs.

References.

1. Hess, A. F., and Weinstock, M.: Jour. Amer. Med. Assoc., 1923, lxxx., 687.
2. (*a*) Huldschinsky, K.: Deutsch. med. Woch., 1919, xlv., 712. (*b*) Howland, J., and Park, E. A.: Bull. Johns Hopkins Hosp., 1921, xxxii., 314. (*c*) Studies of Rickets in Vienna, 1919–1922, Med. Research Council Spec. Report Series, No. 77, 1923, p. 70.
3. (*a*) Ibid., p. 44. (*b*) Hess, A. F., Unger, L. J., and Pappenheimer, A. W.: Proc. Soc. Exper. Biol. and Med., 1921, xix., 8; Jour. Exper. Med., 1922, xxxvi., 427. (*c*) McCollum, E. V., Simmonds, N., Powers, G. F., Park, E. A., and Shipley, P. G.: Jour. Amer. Med. Assoc., 1922, lxxviii., 159, and Johns Hopkins Hosp. Bull., 1922, xxxiii., 125.
4. Telfer, S. V.: Quart. Jour. Med., 1922, xvi., 63.
5. (*a*) Hess, A. F., and Gutman, M. B.: Jour. Amer. Med. Assoc., 1922, lxxviii., 29. (*b*) Kramer, B., Casparis, H., and Howland, J.: Amer. Jour. Dis. Child., 1922, xxiv., 20. (*c*) Casparis, H., and Kramer, B.: Bull. Johns Hopkins Hosp., 1923, xxxiv., 219. (*d*) Howland, J., and Kramer, B.: Amer. Jour. Dis. Child., 1921, xxii., 105.
6. (*a*) Goldblatt, H., and Soames, K. M.: THE LANCET, 1922, ii., 1321. (*b*) Hume, E. M.: Ibid., p. 1318.
7. Steenbock, H., and Black, A.: Jour. Biol. Chem., 1924, lxi., 405.
8. Hess, A. F.: Science, 1924, lx., 269.
9. Nelson, E. M., and Steenbock, H.: Jour. Biol. Chem., 1925, lxii., 575.
10. Hess, A. F., and Weinstock, M.: Amer. Jour. Dis. Child., 1924, xxviii., 517.
11. Kugelmass, I. N., and McQuarrie, I.: Science, 1924, lx., 272.
12. (*a*) Webster, A., and Hill, L.: Brit. Med. Jour., 1925, i., 956. (*b*) Schultz, F. W., and Morse, M.: Amer. Jour. Dis. Child., 1925, xxx., 199.
13. Steenbock, H., and Daniels, A. L.: Jour. Amer. Med. Assoc., 1925, lxxxiv., 1093.
14. Hess, A. F.: Ibid., p. 1910.
15. Rosenheim, O., and Webster, T. A.: THE LANCET, 1925, i., 1025.
16. Hess, A. F., and Weinstock, M.: Jour. Biol. Chem., 1925, lxiv., 193.
17. Ibid., p. 181.
18. Cowell, S. J.: Brit. Med. Jour., 1925, i., 594.
19. Kramer, B.: Amer. Jour. Dis. Child., 1925, xxx., 195.
20. Hess, A. F., and Weinstock, M.: Jour. Biol. Chem., 1925, lxiii., 297.
21. Steenbock, H., and Black, A., and others: Ibid., 1925, lxiv., 263.
22. Studies of Rickets in Vienna, 1919–1922. Med. Research Council Spec. Report Series, No. 77, 1923, p. 125.

ULTRA-VIOLET IRRADIATION IN THE ACTIVATION OF CHOLESTEROL AND FOODS.

BY ALFRED F. HESS, M.D.,
AND
MILDRED WEINSTOCK, B.S.

(From the Department of Pathology, College of Physicians and Surgeons, Columbia University, New York.)

IT is thoroughly established that animals as well as infants can be protected from rickets by means of the ultra-violet rays from the sun or mercury-vapour or carbon-arc lamps. It has been shown also by several investigators that under certain conditions growth can be brought about in animals by subjecting them to these rays. A year or more ago Hume and Smith [1] reported that they were able to stimulate growth by keeping rats in an atmosphere which had been irradiated with ultra-violet rays. These experiments, however, have not been corroborated. Webster and Hill,[2] in a paper entitled the Supposed Influence of Irradiated Air on Growth, recently reported negative results. This likewise was our experience in tests of this kind carried out about two years ago.

Effect of Irradiation of Inert Oils.

In view of the remarkable effect of the solar rays on vegetable life, it occurred to us to ascertain whether the irradiation of inert vegetable substances could endow them with antirachitic properties. With this end in view, we irradiated various fluids with the ultra-violet light from a mercury-vapour quartz lamp. In June, 1924, we communicated to the American Pediatric Society [3] a preliminary report of these experiments, which may be summed up by the statement that vegetable oils which are ordinarily inert were found to have developed marked antirachitic activity following irradiation. The oil used in these experiments were cotton-seed and linseed oils, which were exposed in Petri dishes in very thin layers. Soon after this communication Steenbock and Black [4] reported similar results with irradiation of various foods. More recently these experiments have been corroborated by Webster and Hill.[5]

During the past year this work has been continued and extended in various directions.[6] It was found that the irradiated vegetable oils maintained this acquired potency for a very long period. Recently we tested cotton-seed oil that had been irradiated one year ago and kept ever since under ordinary conditions in a stoppered bottle, and found that 0·1 c.cm. sufficed to protect rats which were placed on a stringent rickets-producing diet. Growing wheat, whether green or ætiolated, was activated in this manner, as were green or yellow lettuce leaves. Chlorophyll seemed to play no rôle in this activation; indeed, an attempt to activate solutions of chlorophyll consistently failed. Among other substances which could not be activated by these radiations may be mentioned hæmoglobin, cream, phosphatide of yolk of egg, glycerol, and gelatin. Oxygen seemed to play little or no part in this process, as the change was found to take place in an atmosphere of nitrogen. On the other hand, refined wheat flour readily underwent activation, as did dry milk powder. Recently dried milk which had been irradiated three months ago was again tested and found to be active; 5 per cent. of this dried milk powder substituted for an equivalent amount of the flour in the standard rickets-producing dietary was sufficient to render it a markedly rickets-protective, instead of a rickets-producing, ration. In this connexion it is of interest to note that Cowell,[7] in a recent paper entitled Irradiation of Milk and the Healing of Rickets, reported favourable results in the treatment of animals with irradiated fluid milk. Kramer likewise has reported favourable results with irradiated fluid milk in the cure of infantile rickets.[8]

As it has been repeatedly shown that the active principle of cod-liver oil is present in its non-saponifiable and absent in its saponifiable fraction, it was interesting to ascertain whether this same relationship held true for activated vegetable oil. Without entering into the technical details of this experiment, which may be found elsewhere, it may be stated that fractionisation showed that the active principle is present only in the non-saponifiable moiety of the irradiated oil, the other fraction being apparently as inert as ordinary oil which has not been irradiated.

Antirachitic Potency Conferred by Irradiation.

In January of this year we communicated the results of a series of experiments [9] which showed that the phytosterol obtained from these oils, although unable to protect against rickets, can in the same way be endowed with antirachitic potency, and, furthermore, that irradiation experiments carried out with purified cholesterol gave the same result (Table I.).

TABLE I.—*Irradiated Cholesterol and Phytosterol.*
Rickets-producing Diet.—Low Phosphorus No. 84.

Rat weight.	Substance fed.	Rickets.	Blood P. (inorganic).
g.			mg. %
50–60	0·25 c.cm. cholesterol,*	No.	4·80
44–40	*irradiated* 1 hr. at 1 ft.	,,	
40–40		,,	2·99
44–34		,,	
50–50		,,	
30–34		,,	
40–40	0·1 c.cm. cholesterol,*	,,	
40–42	*irradiated* ½ hr. at 1 ft.	,,	2·85
50–50		,,	
48–50	0·25 c.cm. cholesterol,*	Mod.	
44–50	*non-irradiated.*	,,	
44–50		,,	3·64
40–46		,,	
40–40		,,	
34–38		,,	
44–38		Slight.	2·41
38–30		,,	
40–50	0·25 c.cm. phytosterol,*	No.	
48–42	*irradiated* 1 hr. at 1 ft.	,,	3·31
50–50		,,	
30–46	0·25 c.cm. phytosterol,*	Mod.	
50–54	*non-irradiated.*	,,	2·70
38–58		,,	
38–36		Slight.	
40–44		Mod.	2·40
30–30		Slight.	

* 1 per cent. in water.

For these experiments the cholesterol was irradiated either dry or suspended in water, and was fed to the rats usually in a dosage of 0·1 c.cm. daily of a 1 per cent. suspension. Shortly thereafter the results of further experiments with irradiated cholesterol were communicated. It was found that activated cholesterol is able to exert its protective effect, not only when it is given by mouth, but likewise when it is suspended in water and injected subcutaneously in small amounts. This result will have to be studied further, in view of the fact that cod-liver oil is supposed to be of little or no value when given by this method. A series of tests with selective filters brought out the additional fact that the radiations which render cholesterol active biologically are similar in wave-length to those which we had previously found to be protective when animals were exposed directly to the rays. In general, it may be stated that these effective wave-lengths are about 300 $\mu\mu$, and that ultra-violet radiations longer than 313 $\mu\mu$, as well as all the visible rays of the spectrum, have no power whatsoever to bring about this alteration.

It has been shown by various investigators that rickets can be developed in rats as the result of placing

them on diets either low in phosphorus or low in calcium. The microscopic picture of the bones is somewhat different according to which of these rations is fed. It was found that irradiated cholesterol is effective in preventing rickets occasioned by either of these deficient diets—whether low in phosphorus or low in calcium.

Activation of Cholesterol.

These experiments with cholesterol have been recently confirmed by various investigators. Drummond and his co-workers [10] obtained similar results with irradiated cholesterol obtained from brain or from cod-liver oil. Rosenheim and Webster [11] activated cholesterol dissolved in liquid paraffin. By these methods they seem to have been able to reduce the required protective dose to less than 1 mg. Very recently Webster and Hill,[6] in an article on the Causation and Prevention of Rickets, state that "further investigations show that cholesterol or a vegetable sterol after radiation has very great antirachitic power." It seems evident, therefore, that there can be no doubt regarding the fact that either phytosterol or cholesterol can regularly be activated by means of ultra-violet irradiation.

As far as we know, there have been no previous experiments on the effect of ultra-violet rays on these sterols. Some years ago Ritter [12] observed that preparations of cholesterol, prepared some 25 years previously, had become yellow in colour during this interval. He writes that "the preparation had stood in glass-stoppered closed bottles in a glass cupboard." A few years later Schulze and Winterstein [13] reported that they had kept some cholesterol for two years between watch-glasses, and that it had become yellow and its melting-point had fallen from 146·5° to 135°. Some cholesterol, which had been stored for the same length of time in a test-tube in an atmosphere of carbon dioxide, showed a lowering in the melting-point of only 1°. Their conclusion was that the alterations were probably an oxidation effect occurring in association with light. These changes in cholesterol can have nothing in common with the activation which we are considering. The fact that the change took place while the cholesterol was in glass bottles and in a cupboard eliminates this possibility, for, as is well known, the radiations which are able to traverse glass are inert in relation to rickets. Our experiments have shown that when cholesterol is activated by means of ultra-violet light its melting-point is but little altered and that it does not change in colour. It is only after it is irradiated for long periods, for six or eight hours or longer, that its melting-point falls and that it begins to develop a yellow tint. But when such chemical and physical changes are brought about it is found that the cholesterol is not active, that the prolonged irradiation has caused it to pass through the stage of activation into one of de-activation. After the irradiation has been maintained for a period of 24 to 48 hours the cholesterol acquires a canary yellow colour, and its melting-point drops to a point similar to that reported by Schulze. It may be added that animal tests have shown that cholesterol which has been de-activated by means of prolonged irradiation cannot be reactivated by the ultra-violet rays; the reaction is not reversible.

These biological experiments were confirmed by means of spectral absorption tests, in which the cholesterol was dissolved in alcohol and illuminated by means of the mercury-vapour lamp. These tests showed that activated cholesterol absorbs ultra-violet radiations to a less degree than does ordinary cholesterol, an effect which is intensified to a certain extent with increasing amounts of irradiation. If, however, irradiation is prolonged for many hours the activated cholesterol becomes even less transparent than non-irradiated cholesterol. Visible light, radiant heat, and Rontgen rays do not alter the absorption spectrum of cholesterol. It is unnecessary to give in detail the result of these experiments as they have been reported elsewhere.[9] They are mentioned merely to emphasise the fact that they confirmed in all respects the biological tests which were carried out on rats. The fact that spectral absorption was altered in the course of activation would seem to indicate that the change is of a chemical rather than of a physical nature. In this connexion it may be added that attempts to concentrate the active fraction of irradiated cholesterol proved abortive, and that successive fractions which were obtained in this way were found to be less active, rather than more active, when tested biologically or by the spectral absorption method.

In view of the fact that ultra-violet rays are specific in the therapy of rickets, and that these radiations do not penetrate the skin, an experiment was devised to determine whether the skin itself could be activated after having been removed from the body. Skin is particularly rich in cholesterol; in fact, no other organ except the brain contains a greater total amount of this substance. It seemed, therefore, probable that the cholesterol in the epidermis would respond to irradiation. To this end human skin and calf skin were irradiated and fed daily in 1 g. per capita amount to rats which were receiving a low phosphorus diet. The control series received non-irradiated skin. As will be seen in Table II., the rats

TABLE II.—*Feeding Experiments with Irradiated and Non-irradiated Skin.*

Rickets-producing Diet.—Low Phosphorus No. 84.

Rat No.	Weight.	Substance fed.	Rickets.		Blood P. (inorganic).
			Radiographic.	Macroscopic.*	
	g.				mg. %.
7388	60–60	1 g. human skin,	No.	No.	2·97
7389	74–80	*irradiated* ½ hr.	,,	,,	
7390	70–80	at 1 ft.	,,	,,	
7391	60–70		,,	,,	
7392	60–64	1 g. human skin,	Mod.	Mod.	1·04
7393	60–60	*non-irradiated.*	Slight.	Slight.	
7394	70–80		Mod.	Mod.	
7395	72–80		,,	Slight.	
7396	60–60	1 g. calf skin,	No.	No.	2·95
7397	74–96	*irradiated* ½ hr.	,,	,,	
7398	60–80	at 1 ft.	,,	,,	
7399	74–90		,,	,,	
7400	60–64	1 g. calf skin,	Mod.	Mod.	1·25
7401	64–68	*non-irradiated.*	,,	,,	
7402	72–84		Marked.	Marked.	

* Microscopic, Nil.

which received the irradiated skin were regularly protected from rickets, whereas the control animals developed rickets; the inorganic phosphorus of the blood followed a parallel course. This result is of interest in connexion with the recent experiments of Luce,[14] who found that "exposure to sunlight appears to have a small effect in determining the antirachitic value of the milk" of the cow.

It would seem quite possible that the cholesterol in the skin is normally activated and rendered antirachitic by ultra-violet irradiation, that the solar rays and similar artificial radiations are able to bring about this conversion. This point of view regards the superficial skin as an organ which reacts to particular light waves (the epidermal organ) rather than as a mere protective covering.

Application to Practical Dietetics.

The remarkable antirachitic potency which has been brought about in cholesterol and in vegetable and animal foods by means of artificial irradiation naturally suggests an application of this procedure to practical dietetics. Table III. illustrates the results obtained in cases of rickets by giving irradiated foods or cholesterol. It will be noted that the best result was obtained with irradiated dried milk. This milk was irradiated in thin layers for a period of half an hour with the lamp at a distance of 1 foot.

In regard to the spinach, which is recorded in the table, and which was found to have acquired antirachitic properties, it should be added that it was cooked for half an hour subsequent to having been irradiated, and that this process did not seem to have affected its activity. A test was carried out also with cholesterol. This cholesterol was irradiated in the dry state for half an hour with the lamp at a distance of 1 foot, and was at once incorporated in cotton-seed oil to the extent of 3 per cent.

TABLE III.—*Treatment of Rachitic Infants with* IRRADIATED FOODS (*March*).

Case.	Age (mos.).	Food.	Inorganic P. (mg.)	Radiograph.
1	5	Carrots.	3·1 .. 2·9	Slight healing.
2	5		3·2 .. 3·2	Negative.
3	5		3·2 .. 2·3	,,
1	9	Spinach.	2·7 .. 3·5	Slight healing.
2	19		2·6 .. 3·5	,, ,,
3	7½		3·4 .. 2·9	Negative.
1	4	Cholesterol (3% in oil).	2·2 .. 2·7	Slight healing.
2	5		2·2 .. 3·1	,, ,,
3	6		2·5 .. 4·5	,, ,,
1	13	Dry milk.	2·6 .. 4·1	Mod. healing.
2	13		3·3 .. 5·1	Healed.
3	9		2·4 .. 4·8	Mod. healing.

An extensive series of experiments had developed the fact that cholesterol which had been irradiated by ultra-violet rays readily lost its acquired activity when kept either in a dry state or suspended in water, but that it did not undergo this "ageing process" when dissolved in oil. Irradiated cholesterol, when given in oil in a dosage of two teaspoonsful daily, brought about definite improvement in the course of four weeks. It is premature to discuss whether the antirachitic action of irradiated cholesterol is comparable to that of ultra-violet rays or to cod-liver oil. Recent experiments would tend to indicate that larger doses are of advantage. However, the established fact that foods, as well as cholesterol and phytosterol, can be endowed with specific antirachitic potency has, quite apart from any clinical application, a definite theoretical interest and value. It furnishes a chemical basis for interpreting the remarkable action of ultra-violet irradiation in rickets.

At the present time it is difficult to state the relationship between activated cholesterol and the vitamins. The definition of a vitamin is so vague that there may well be a difference of opinion as to whether one should consider that a vitamin has been elaborated by means of irradiating cholesterol. It is true that the amount of irradiated cholesterol which is needed for protection or cure is of the magnitude which we are accustomed to associate with the vitamins. This question, however, has now advanced beyond the phase of biology into the sphere of chemistry, and judgment must be deferred until the subject has been elucidated by chemical investigation.

Bibliography.

1. Hume, E. M., and Smith, H. H.: Biochem. Jour., 1923, xvii., 364.
2. Webster, T. A., and Hill, L.: Ibid., 1924, xviii., 340.
3. Hess, A. F.: Proc. Amer. Pediat. Soc., June 7th, 1924; abstracted in Amer. Jour. Dis. Child., 1924, xxviii., 256.
4. Steenbock, H., and Black, A.: Jour. Biol. Chem., 1924, lxi., 405.
5. Webster, T. A., and Hill, L.: Brit. Med. Jour., 1925, i., 956.
6. Hess, A. F., and Weinstock, M.: Proc. Exp. Biol. and Med., 1924–25, xxii., 5, 6, 76; Jour. Biol. Chem., 1924, lxii., 301; 1925, lxiii., 297.
7. Cowell, S. J.: Brit. Med. Jour., 1925, i., 594.
8. Kramer, D.: Amer. Pediat. Soc., May, 1925.
9. Hess, A. F., and Weinstock, M.: Proc. Soc. Exp. Biol. and Med., 1925, 227, 315; Jour. Biol. Chem., 1925, lxiii, 305; lxiv., 181, 193; Jour. Amer. Med. Assoc., 1925, lxxxiv., 1910.
10. Drummond, J. C., Rosenheim, O., and Coward, K. H.: Jour. Soc. Chem. Industry, 1925, xliv., 123.
11. Rosenheim, O., and Webster, T. A.: THE LANCET, 1925, i., 1025.
12. Ritter, E.: Zeitschr. f. Physiol. Chemie, 1901, xxxiv., 480.
13. Schulze, E., and Winterstein, E.: Ibid., 1904, xliii., 316; 1906, xlviii., 546.
14. Luce, E. M.: Biochem. Jour., 1924, xviii., 1279.

ISCHÆMIC NECROSIS OF THE CARDIAC WALL.[1]

BY CAREY F. COOMBS, M.D., F.R.C.P. LOND.,
PHYSICIAN WITH CHARGE OF OUT-PATIENTS TO THE BRISTOL GENERAL HOSPITAL;
AND
GEOFFREY HADFIELD, M.D., M.R.C.P. LOND.,
PATHOLOGIST TO THE HOSPITAL.

(*With Coloured Plate.*)

SUDDEN or rapid occlusion of a larger branch of one of the coronary arteries of the heart by thrombosis or (much less often) by embolism initiates certain series of symptoms which it is convenient to group under three heads: (*a*) acute ventricular failure, (*b*) chronic cardiac failure, and (*c*) death before diagnosis.

Cases with Acute Ventricular Failure.

The largest group is that fully described in recent years by American physicians. Our experience of these has differed from theirs in that we have not seen a necropsy in a case of this kind. Possibly the fact that hospital patients in America come from a less restricted social stratum than in this country may account for the difference. Anginal symptoms are much more often encountered in private than in hospital patients in this country. Our own experience of this category of symptoms, embracing about a dozen cases, all of which, save one, arose in men, and all in persons of 60 or more, has been drawn exclusively from private practice. The following note of one of these histories embodies most of the points to which we need draw attention.

The patient, a medical man of 62, had for some long time been known to have a high blood pressure. For a year, on and off, he had been troubled by præcordial pain. The night before he was first seen by one of us (C. F. C.) he had a very severe attack of this pain, the worst he had ever experienced. He gave himself ¼ gr. of morphine and used a boxful of amyl nitrite capsules without any relief; this he finally secured by administering chloroform to himself by inhalation. When seen he was orthopnœic, pallid, and sweating. He had a wide, feeble impulse, triple rhythm, and an alternating pulse. Two days later the pain had quite gone, but there was tenderness over the præcordia, the pulse still alternating, its rate 116 per minute, and there was a characteristic pericardial to-and-fro rub over the area of cardiac impulse, with râles at the bases. Seen again that night, he appeared to have a totally irregular pulse, but no record could be made. Next day this arrhythmia had gone, but the pulse was still alternating. He improved for a few days, then died suddenly in the night.

Some of our patients have died in the attack; others have survived for days or weeks in a precarious state of collapse, punctuated and aggravated by recurrence of the initial symptoms. There is often slight fever for the first few days. The patients have been so ill that it has, unfortunately, been impossible to get any electrocardiograms.

Cases with Chronic Cardiac Failure.

In this class the patient survives longer, possibly because the arterial occlusion is less rapidly consummated. The symptoms are well illustrated by the following history.

A woman of 39 was well till January, 1922, when she had "influenza." In the following month she had attacks of paroxysmal dyspnœa with vomiting. Ever since then she had been orthopnœic, with loss of flesh. When seen by one of us (C. F. C.) she had a pulse of 108 to the minute, which alternated; a blood pressure of 140 mm. Hg systolic and 120 diastolic; a diffuse impulse, its area being increased to the left; and a bruit de galop. She was very œdematous as high as the waist. Death ensued about three months after the onset.

Post-mortem.—The territory of the anterior descending branch of the left coronary artery was extensively fibrosed, white, and tendon-like. A thin line of muscle and an intact endocardium covered it internally; its pericardial

[1] Concluding a discussion introduced by Dr. A. G. Gibson at a recent meeting of the Cardiac Club. See THE LANCET, Dec. 19th, 1925, p. 1270.

FIG. 1.

FIG. 2.

FIG. 3.

FIG. 4.

DR. CAREY F. COOMBS AND DR. GEOFFREY HADFIELD: ISCHÆMIC NECROSIS OF THE CARDIAC WALL.

DESCRIPTIONS OF ILLUSTRATIONS.

Infarction (anæmic necrosis) of the heart wall.

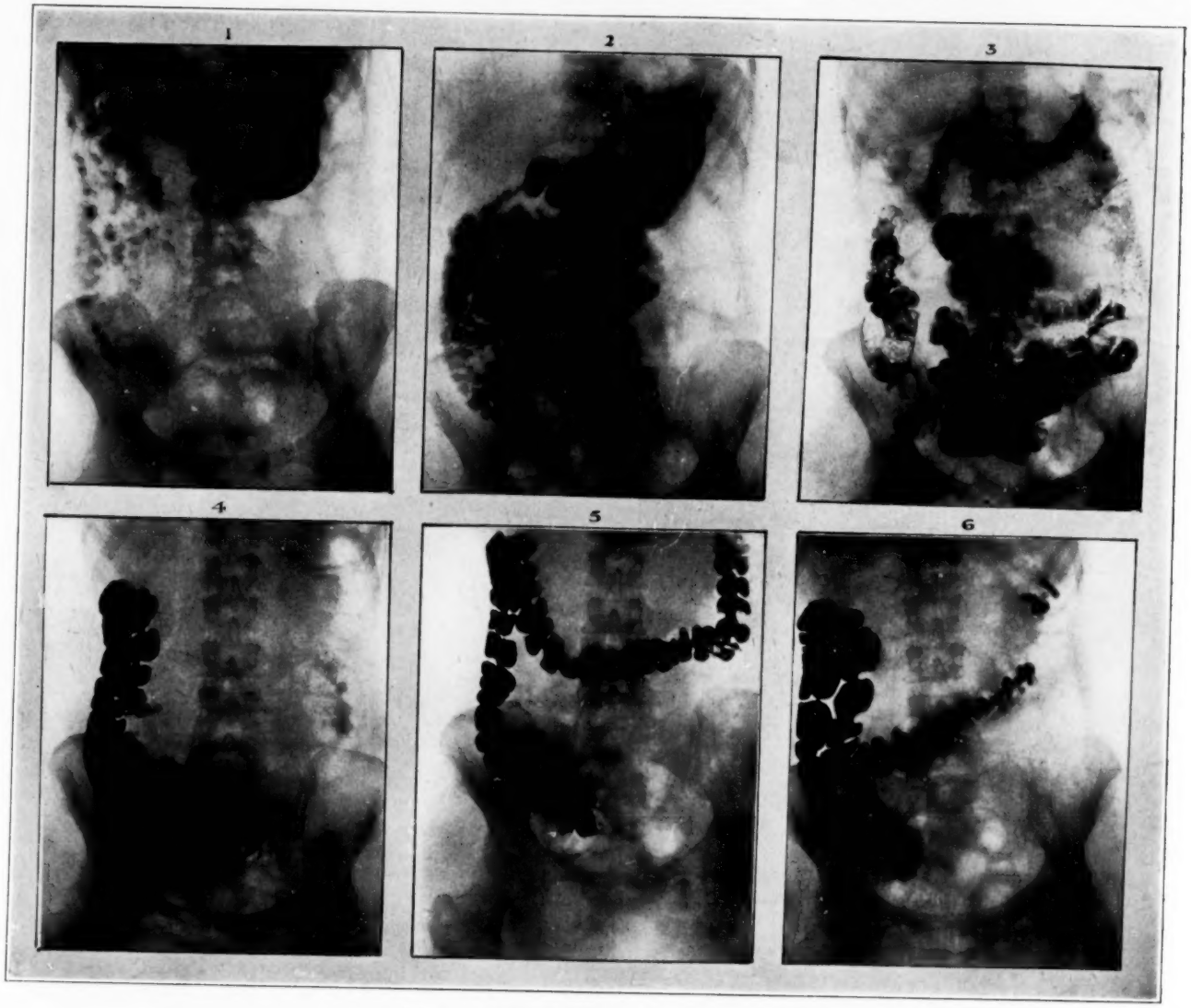
Male aged 48. Following thrombosis of an arterio-sclerotic coronary artery. Lesion is 3-5 days old.

Fig. 1. Inter-ventricular septum in section.

Fig. 2. Left ventricular wall in section: through centre of lesion.

Fig. 3. Left ventricular wall in section: through edge of lesion.

Fig. 4. Diagram showing extent of lesion. Necrotic muscle in yellow.



Skiagrams taken after ingestion of a bismuth meal.

surface was not adherent. The fibrosed muscle was slightly stretched and the lesion formed an ill-defined pouch. There was no suggestion of recent infarction. The anterior descending branch of the coronary artery was obliterated at its origin in the auriculo-ventricular groove, apparently by old thrombosis. Arterio-sclerosis was slight in the other coronary vessels.

Cases with Unrecognised Symptoms.

In this group the patient dies of symptoms, the nature of which is not realised during life.

The coloured plate (for which we are indebted to MISS PILLERS) accompanying this note represents the heart of a man of 49 who was sent up to the ward, seen by one of us (C. F. C.) at the end of a round, and put to bed for detailed observation. He said that for about a year he had had pain under the sternum on exertion. About a week before admission, his own doctor had seen him and diagnosed influenzal pneumonia, but had remarked the disproportionate severity of his dyspnœa. When admitted he was pale and very dyspnœic, but able to talk cheerfully and even to joke about the prospect of an early return to work. There were râles all over both chests, and in retrospect it seems that the heart sounds must have been weak, but at the moment no physical signs of cardiac disease were noted and the presence of a serious heart lesion was barely suspected. He became rapidly worse and died that night.

Post-mortem.—Extensive, massive, and recent infarction of the heart wall was present at a stage rarely found at autopsy, the mass of opaque, yellow and necrotic muscle being still in situ, and its irregular sinuous edge clearly marked out by a thick line of congested arterioles. The area of ischæmic necrosis is indicated in the diagram; it did not correspond exactly with the territory of the occluded vessel and (as is usual) the deep central layers of the muscle were most affected. Typical gummatous aortitis was present, and one lung presented the naked-eye picture of pneumococcal lobar pneumonia, such as is seen about the fourth to the sixth day. The myocardial infarction and the pneumonia were of approximately the same age, and it is tempting to assume that they were related, the acute pulmonary infection being the immediate cause of the recent obliteration of an artery already narrowed by syphilitic infection.

In this category also should be included cases the symptoms of which are apparently abdominal.

A RADIOLOGICAL STUDY OF A CASE OF INCOMPLETE INTESTINAL OBSTRUCTION.

BY T. I. CANDY, M.B., B.CH. BELF., D.M.R.E. CAMB.,

HON. RADIOLOGIST TO THE ROYAL GWENT HOSPITAL, NEWPORT, MON.

(With Illustrative Plate.)

THE accompanying illustration of a series of six bismuth-meal skiagrams will be of interest as a radiological study of obstruction of the intestinal tract and as an example of modern radiographic technique. A short account of the clinical course of the case is given from the surgical and pathological points of view.

The skiagrams were taken at the following intervals after ingestion of the bismuth meal, all in the prone position: (1), 5 minutes; (2), 3 hours; (3), 6 hours; (4), 12 hours; (5), 24 hours; (6), 36 hours. (See plate.)

For the information of those interested in the technical side, the following are the exposure data which were the same for each skiagram: Exposure time, 1 second; spark-gap, 5 inches; milliampèrage, 40 ma.; focal film distance, 30 inches; instrument, 10 K.V.A. transformer; tube, standard Coolidge; screens, double intensifying; film, 15 by 12, Eastman dupli-tized, ordinary.

Another no less important factor in the attainment of the uniform result was the dark-room technique, which was carried out strictly in accordance with the directions of the makers of the dupli-tized X ray film—namely, development for a standard time of five minutes, with a standard developer formula, at a standard temperature of 65° F.

History of the Case.

The patient, a woman, aged 47, was admitted to the surgical wards of the Royal Gwent Hospital, under Mr. Morrell Thomas, in January, 1923. She complained of constant abdominal pain more or less in the region of the umbilicus and right iliac fossa, but not very definitely localised. There was deep tenderness over the ileo-cæcal region. The symptoms dated back for 12 years. Appendicectomy had been performed ten years previously, which gave temporary relief. The symptoms recurred about six months afterwards, at first in a mild form, but gradually getting worse. For the past two years she had been a complete invalid with abdominal pain. Vomiting was an occasional symptom but not a frequent one. She always suffered greatly from constipation. She was losing weight, and said she was only a shadow of her former self. Weight on admission, 7 st. She had been in several hospitals, but a second operation had not been undertaken. She had not previously had a bismuth-meal X ray examination.

X Ray Examination Report.

Retention in stomach after six hours. Definite ileal stasis and marked dilatation of the coils of the jejunum, showing prominently the valvulæ conniventes. There is narrowing of the terminal few inches of the ileum, causing a partial obstruction (Fig. 3) and stasis in the large bowel.

Operation.

Laparotomy was performed by Mr. Thomas in February, 1923. The terminal 6 inches of the ileum along with its mesentery were found to be thickened and indurated. Mr. Thomas described it as resembling the appearance and feel of a "leather-bottle stomach." The part was excised, including the thickened mesentery, and ileo-cæcostomy was performed. After the first week the patient began to gain strength. All symptoms gradually disappeared, and she was discharged from hospital "cured" on March 17th, 1923.

Pathological Report.

Dr. H. W. Catto, hon. pathologist, reported as follows on the excised specimen:—

Naked-eye examination.—The intestinal wall is thickened and the lumen narrowed with the mucous membrane thrown into folds. The mesentery attached to this portion is half an inch thick and is leathery to the feel.

Microscopic examination.—There is no new growth, either innocent or malignant, no specific inflammation, either tuberculous or syphilitic, and no degenerative changes. The thickened mesentery is due to a copious deposit of fat which also spreads over the bowel. The musculature of the intestine is hypertrophied, indicating that it had difficulty in doing its work. It would seem that the lipomatosis impeded peristalsis, causing hypertrophy and spasm of the muscle tissue, causing the latter to act as a pylorus tonically contracted so that the lumen was narrowed and the symptoms of obstruction arose.

Present Condition.

Being interested in the after-history of the case I recently wrote asking the patient to come to hospital and report upon her present condition. She said she no longer suffered from any of the old symptoms and was in excellent health and able to carry out her household duties in a manner she had not done for years. She had excellent appetite and slept well. She said, however, that she had had occasional bouts of diarrhœa lasting a few days which had been troublesome for some months after the operation, but that she was being troubled less and less with this symptom. She looked in excellent health and had gained nearly 2 st. in weight.

Observations.

In all probability this peculiar pathological condition was present ten years ago when appendicectomy was performed and was overlooked at the time of the operation, but the question is if X ray examination had been carried out at that time would it have detected the nature of the trouble and localised the seat of obstruction so definitely as it did ten years after? The answer in all probability is no, because the condition was more advanced when the present X ray examination was made, and radiographic technique has advanced considerably during that period.

I wish to acknowledge my indebtedness to Mr. Thomas for his kind permission to make use of the clinical notes of the case, and to Dr. Catto for permitting me to publish his pathological observations.

BOROCAINE:

A NEW LOCAL ANÆSTHETIC.

BY E. WATSON-WILLIAMS, *M.C.*, CH.M., F.R.C.S. EDIN.,
CLINICAL LECTURER IN LARYNGOLOGY AND OTOLOGY, UNIVERSITY OF BRISTOL.

BOROCAINE is announced, in the terms invariably employed for any new local anæsthetic, as possessing negligible toxicity and high anæsthetic efficiency. These two properties represent the fundamental criteria for estimating the utility of a new drug of this class. The value to clinical users of observations on these matters depends largely on the fidelity or otherwise with which clinical conditions can be reproduced.

Toxicity.

In measuring toxicity we are compelled to rely on animal experiments, trusting that the information they give will be reflected in clinical practice. The points that have appeared to the author to demand attention, if our results are to be really helpful, can be summarised as follows:—

1. Subcutaneous injection of the drug affords the only method of administration which corresponds to clinical usage, and at the same time permits accurate measurement of the dose. A constant site of injection is necessary.

2. Since clinically only dilute solutions are injected, the greatest practicable dilution of the drug should be employed. This materially affects some drugs, but not all. Literally to use clinical dilutions is not practicable.

3. The same volume of diluent, approximately, should be used for the critical dose of each drug.

4. Apes are too expensive to use. Mice, rats, rabbits show a considerable tolerance to drugs of this class. Cats, dogs, guinea-pigs afford a useful compromise, having a susceptibility not much less than man.

5. The fraction of the fatal dose that will give convulsions is different with each drug. The minimal lethal dose affords essential information, and a measure of toxicity applicable to all drugs; and should be our standard of toxicity.

6. Finally, our deductions must be "fair"; for example, if we are dealing with drugs of very varying alkaloid content, we should emphasise the fact to avoid the chance of the general reader being misled.

Guided by these considerations, experiments were carried out with guinea-pigs, carefully chosen for uniformity. The greatest practicable dilution is one that gives a volume of 5 to 10 c.cm. for the minimal lethal dose in a guinea-pig of 500 g. (called the "standard dose"). The author had prepared a quantity of ethocaine borate before the drug was commercially available; this had a melting point 166° C.; and gave a pH between 8·0 and 8·5. Porocaine E was also kindly supplied by the manufacturers. The following is an abridged protocol of a typical experiment:—

No. 271.—Weight, 444 g. Injection of 5·50 c.cm. of borocaine E solution, 5 per cent. at 11.44 A.M., 15/10/25.

Minutes.	
12	Dazed, quiet.
17	Falls over, head retraction.
25	Severe general convulsions.
41	Gasping, feeble movements.
76	Feeble scratching, cannot rise.

The animal was nearly, but not quite, recovered when chloroformed at 5 P.M.
Dose: 275 mg.–620 mg. per kilo.

The results of a series of experiments are summarised in Table I.

From Table I. we see that though the toxicity of ethocaine borate is much less than that of cocaine, it is a measurable quantity. It is to be noticed that the concentration of ethocaine in the two series, as hydrochloride and as borate, was almost identical; that the dilution of drug was again the same; and that *the toxicity of ethocaine is the same whether it is given as hydrochloride or as borate.* The apparent difference between the two salts is to be attributed to the great difference in their alkaloid content.

TABLE I.

Drug.	Concentration of solution.	Alkaloid content of—		Dose survived, in gm./kilo.	Minimal lethal dose in gm./kilo.	Volume of standard dose c.cm.	Lethal toxicity of—		Comparative toxicity of drug: Cocaine HCl = 1.
		Drug.	Solution.				Drug kilo/gm.	Alkaloid kilo/gm.	
	%	%	%						
Cocaine .	0·5	89·3	0·45	0·057	0·060	6·0	16·7	18·4	1·0
Novoc. .	3·0	86·6	2·60	0·38	0·40	6·7	2·5	2·9	0·15
Borocaine E	5·0	52·9	2·55	0·62	0·65	6·5	1·5	2·9	0·09
Eth. bor.	5·0	52·9	2·55	0·62	0·65				

Cocaine = Cocaine hydrochloride, B.P. Novoc. = novocaine. Ethocaine hydrochloride (kerocain). Borocaine E = Ethocaine borate, B.D.H. Eth. bor. = Ethocaine borate, E. W.-W.

Anæsthetic Efficiency.

If it is important closely to imitate the conditions of clinical usage when estimating toxicity—though such an estimate will only give us an approximate guide in practice—it is still more important when appraising anæsthetic efficiency, for the latter is the clinically essential matter. For the general user, "anæsthetic efficiency" implies a measure of the power of producing anæsthesia. If a given solution produces anæsthesia readily—that is, rapidly—we say that its anæsthetic efficiency is high, and vice versa. There being no absolute standard, all our estimates are comparative. If two solutions produce anæsthesia in the same time we can say that their efficiency is the same, and thence deduce the relative efficiencies of their constituents.

The phrase "surface anæsthesia" implies anæsthesia resulting from surface application; it must not be confounded with "superficial anæsthesia." At least in the nose, the latter is relatively unimportant, though readily produced. It is for operations involving cutting of bone, &c., that real anæsthesia is necessary. The phrase, therefore, should mean *good anæsthesia down to and including the periosteum.* Such a standard of comparison brings out the real value of different drugs; those that penetrate the tissues slowly produce this deep anæsthesia with difficulty—their "anæsthetic efficiency" is low.

Animal Experiments.

As Le Brocq pointed out in 1909, animal experiments on surface anæsthesia are apt to be very unsatisfactory. The animal does not uniformly indicate pain. We do not know, for example, that the stimulus provoking a leg reflex in a frog bears any but the most superficial resemblance to what man calls pain. And if we rely on the corneal reflex in a mammal, we are probably measuring abolition of sensibility to touch rather than to pain. At least, in man it is easy to show that the reflex is abolished before the cornea is surgically anæsthetic.

There is another, and more serious, objection to the cornea. It is a structure unique in (*a*) thinness of covering epithelium, (*b*) type and distribution of nerve-endings and fibrils, (*c*) vascular arrangements, and (*d*) is devoid of mucous glands, &c. Whatever it may be, it does not at all resemble mucous membrane. Nor can we expect results obtained for the one tissue to apply to the other.

But the efficiency of drugs of this class can be readily ascertained by direct observations in man, under the actual conditions of practice. There is no need for any extensive investigation under the difficulties inseparable from animal experiment.

Method.—What is necessary is to find out under what conditions a given drug produces good anæsthesia. It is "begging the question," for example, to make applications under predetermined conditions as to time or concentration. The time sufficient for

one solution may be inadequate for a second, and more than enough for a third. Yet under proper conditions all will give complete anæsthesia; failure to produce the latter, at least with any preparation commercially available, is a reflection on the technique, not on the drug. All that is shown by a "fixed time" experiment is whether or no the technique is suitable for the drug in question.

Several investigators have measured the *duration* of anæsthesia, and assumed that this is a function of anæsthetic efficiency. The two may be related, but the connexion is obscure. In fact, one may be varied without altering the other. But, at least in nasal surgery, it is rarely that difficulty arises from short duration of anæsthesia once this has been effected.

Efficiency of Borocaine E.

The method evolved by the author is, briefly, as follows. The minimum time is measured from the completion of packing the nose to the onset of complete anæsthesia of bone. In a series of experiments the average time for this to occur with a given solution is determined. The concentration of cocaine hydrochloride, B.P., that will act in the same time is also found, and the comparative efficiency of the two drugs calculated. Good anæsthesia implies that neither flinching nor lacrymation occurs. With borocaine E 5 per cent. solution the best result in six operations was "fair" twice, the rest being "poor," even when packing was continued for 12 minutes, with three changes. A 20 per cent. solution was therefore made, both with the author's preparation and the commercial, and after one or two failures good anæsthesia was produced in 12 successive operations; the average time for this was 9 minutes 46 seconds, or 586 seconds. The method of comparison is shown in Table II. The values found for novocaine are included for interest, as the author had reported (by request) on this drug early in 1925.

TABLE II.

Drug.	Concentration per cent. of—		Time taken to produce complete deep anæsthesia in seconds.	Concentration of cocaine HCl producing anæsthesia in same time.	Comparative efficiency of—	
	Drug.	Alkaloid.			Drug, cocaine HCl = 1.	Ethocaine, cocaine = 1.
Cocaine HCl, B.P.	2·0	1·8	483	—	1·0	1·9
Novocaine, ethocaine HCl ..	20	17·3	411	2·2	0·11	0·11
Borocaine E, ethocaine borate ..	20	10·6	586	1·8*	0·09	0·15

* Calculated.

Since we desire a high efficiency combined with a low toxicity, a convenient measure of value of one of these drugs is obtained by dividing the figure obtained for the former by that obtained for the latter. It is usual to take the value found for cocaine hydrochloride as unity in each case. This has been done in Table III. From this table we see that ethocaine, whether as hydrochloride or as borate, has a value about the same as that of cocaine hydrochloride, as tested by power of producing deep anæsthesia in the nose, but that the borate is about one-third more useful than the hydrochloride. It is suggested, however, that the variations from unity obtained in this manner are within the limits of experimental error. That, in fact, the power of any drug of paralysing the nerve-fibrils beneath the surface is proportional to its power of paralysing the nerve tissue of the medulla. In other words, anæsthetic efficiency is proportional to toxicity. But this is a digression.

TABLE III.

Drug.	Comparative toxicity: Cocaine HCl = 1, Table I.	Comparative efficiency: Cocaine HCl = 1, Table II.	Cocaine efficiency ratio.
Novocaine ..	0·15	0·11	0·7
Borocaine E ..	0·09	0·09	1·0

Other Properties of Borocaine E.

Borocaine, like cocaine hydrochloride, can be boiled for a short time without damage; prolonged boiling causes decomposition. A 2 per cent. solution was prepared in the same manner as cocaine solution and left in its stoppered bottle; at the end of four days it had begun to turn brown, and was quite a definite brown colour by the end of ten. The properties, physical and therapeutic, of this solution were not the same as those of fresh solution, and it appears definite that some decomposition had occurred. The stability in aqueous solution, therefore, seems poor.

All the timed observations reported above were made after the addition of adrenalin 1/10,000. With this, though shrinkage was good, the mucosa was often not well blanched; it is suggested that perhaps the adrenalin had penetrated more rapidly, and so acted on tissues not reached by the borocaine. The onlookers remarked the redness of the mucosa and the definite tendency to bleeding. In five cases, after operation, the nose "fairly poured" mucus tinged with blood. A trivial smarting was observed on application of the 20 per cent. solutions; no case of late irritation was seen, nor was any evidence of toxicity observed. In three cases 5 per cent. borocaine without adrenalin caused definite congestion in the nose. This drug does not appear likely to be very useful for nasal work. It is only fair to state that the proprietors, though claiming "borocaine entirely supersedes cocaine," recommend it for the eye, throat, and urethra, but make no claim that it is suitable for nasal work.

Summary.

1. Experimental methods of estimating toxicity and efficiency are considered. 2. The experimental toxicity of three drugs is shown to be in the proportion: cocaine hydrochloride, 1; novocaine, 0·15; borocaine E, 0·09. 3. The efficiency of the same drugs, as measured by the production of deep anæsthesia in the nose, after application to mucous surface, is found to be in the proportion: cocaine hydrochloride, 1; novocaine, 0·11; borocaine, 0·09. 4. Certain other properties of borocaine are discussed.

A LUNG SPLINT.

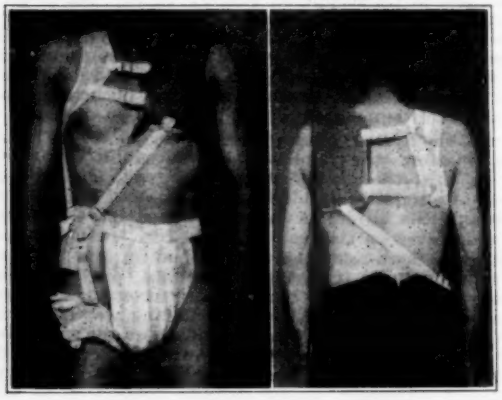
BY R. C. WINGFIELD, M.B., M.R.C.P. LOND.,
MEDICAL SUPERINTENDENT, BROMPTON HOSPITAL SANATORIUM, FRIMLEY.

LIMITATION of movement of diseased portions of the lung has long been recognised as a very important factor in the treatment of pulmonary tuberculosis. It is the principle that underlies the artificial pneumothorax and the various thoracoplastic treatments that are in use at the present day. Before the development of collapse therapy, and even since, in order to avoid drastic procedure perhaps of doubtful value to the patient, attempts have been made to secure this limitation of movement by mechanical means, such as the use of heavy sandbags on recumbent patients, various plaster-of-Paris and other splints, or prolonged posturing, &c. None of these have been very successful for various reasons.

In the majority of cases it is the upper halves of the lungs that are the more grossly diseased, and it is the control of the movement of this region that presents a difficult problem. I have felt for a long time that in cases of unilateral or bilateral disease, where the lesions were massed towards the apex, that if the movement of the diseased parts of the lung

could be limited by even so little as 1 cm. during each respiration the chance of healing and fibrosis would be tremendously increased. In such cases where collapse therapy was impossible or inadvisable I have attempted to control the movement of the upper half of the thorax by what I called an "apex belt," a webbing band 3 or 4 inches broad strapped as tightly as the patient could stand it, encircling the chest as high as possible under the arms. The choice of case was limited, but the results were encouraging.

FIG. 1.

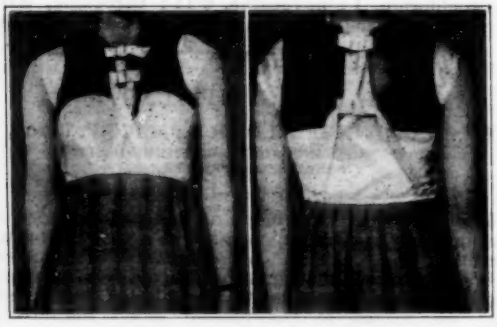


Single open splint showing attachments.

The apex belt, however, had many disadvantages. It was uncomfortable, it was bilateral in action, and it did not control the true apical movement. After some experiments I have devised the splint shown in the accompanying illustrations. It does control apical movement, is entirely unilateral in its action, it does not interfere with manual work, and, if properly made, is not unsightly.

It consists of an aluminium shoulder-piece, covered with rubber and lined by a rubber pneumatic bag

FIG. 2.



Bilateral open splint. Back view.

which can be inflated to any desired pressure. It exerts an inward pressure in all directions, the power being derived from its own rigidity and by anchoring it to the opposite shoulder and thigh, as can be seen in the illustrations, and in this manner it does not interfere in any way with the movements of the opposite lung. The splint and accessories weigh about 1 to 1½ lb.

The early results of its use are apparently encouraging, but, like all other adjuvants to the treatment of pulmonary tuberculosis, its exact value in any individual case is incapable of proof. It is in the hopes that its principles and construction may so appeal to my colleagues in tuberculosis work that they will make a trial of it that I am emboldened to publish this description; for by this means alone can its true value, if any, be assessed.

One essential point is the accurate construction and fitting of the aluminium shoulder-piece. (My thanks are due to Mr. W. Nettleton, third engineer of this sanatorium, who has undertaken this, and who has evolved a very excellent technique for the construction of these splints. The rubbering, pneumatic fittings, and strap attachments have been ably carried out by Messrs. Allen and Hanburys, Ltd., who are prepared to make the splint entirely.) Another essential is the fitting of the deflated splint in its right position, by careful adjustment of the tension of the various straps to suit each individual chest, before it is blown up.

The splint is naturally uncomfortable at first. But if it is carefully adjusted, and if only a slight pneumatic pressure is used for the first few days and gradually increased, patients will wear it without any discomfort during the whole 24 hours.

Clinical and Laboratory Notes.

TWO CASES OF HÆMOLYTIC ICTERUS TREATED BY EXTIRPATION OF THE SPLEEN.

BY L. S. HANNEMA, M.D.,
CHIEF PHYSICIAN TO THE MUNICIPAL HOSPITAL, ROTTERDAM.

THE two cases here recorded presented similar features and were both treated by splenectomy, with favourable results which have lasted for three years and 18 months respectively.

CASE 1.—An unmarried woman, aged 37 years, had had a large spleen from her childhood, with, as long as she remembered, a light yellow discoloration of the scleræ. Her father had always been somewhat icteric and several of her relations had a yellowish complexion. From her sixteenth year she had suffered occasionally from pain in the left side, during which attacks the icterus was more pronounced. As a rule the urine was dark and the fæces of normal colour. For the last three months she had been getting weaker and suffered from anæmic complaints, although previously she felt quite well. On examination she had a slight icterus. The mucous membranes were anæmic. Pulse normal. No glandular swelling. No anomalies of heart or lungs. The liver was slightly hypertrophied, its surface was smooth. The spleen was very large and consistent and extended nearly to the iliac crest and the median line. The urine contained very much urobilin, no bilirubin. The stools were of normal colour. Examination of the blood made out that the hæmoglobin content was 55; erythrocytes 2,600,000, leucocytes 10,500 (8700 were polymorphonuclear), thrombocytes 500,000 (!). There was a marked polychromatophilia and many normoblasts, indicative of the activity of the bone-marrow. The erythrocytes showed fragility, and with 0·6 per cent. NaCl a large number had been hæmolysed. Complete hæmolysis was attained only with 0·2 per cent. (which probably proves a marked bone-marrow reaction).

We had therefore to do with an icteric and strikingly anæmic patient. It is well known that an increased hæmolysis generates a considerable quantity of bilirubin, by which iron is set free, for the greater part in the liver. This excessive formation of bilirubin which is discharged into the intestines results in an increased excretion of urobilin per rectum (normally ca. 150 mg. in 24 hours). An excess of urobilin is absorbed, the liver cannot retain all of it, and so urobilinuria appears. A third symptom of exaggerated hæmolysis is a rise of the bilirubin content of the blood-plasma which may induce icterus, for jaundice may originate from an increased hæmolysis, as well as from bile retention. Hymans van den Bergh [1] has pointed out that by means of

[1] Der Gallenfarbstoff im Blute.

a serum reaction (the so-called direct diazo-reaction) retention icterus can be distinguished from hæmolytic icterus. In my patient this diazo-reaction was negative (as is always the case in hæmolytic icterus), quantitatively the bilirubin content appeared to have very much increased (determined after Hymans van den Bergh's method,[1] 1 : 50,000; normally ca. 1 : 300,000). An intense urobilinuria was recognised; the amount of urobilin of the fæces has not been determined for this patient. Consequently, an intense hæmolysis was manifest. From what has been said it is clear that we were justified in diagnosing the case as one of hæmolytic icterus, that is to say, the hereditary form. Apparently the bone-marrow had been competent to compensate the increased hæmolysis, but for some months the increased hæmolysis had got the better of the still active bone-marrow, and the patient became anæmic.

Before discussing the question of treatment I will describe a second similar case.

CASE 2.—A man, aged 29, complained of intense lassitude, from which he had been suffering for four months. For several years he had been slightly jaundiced. He had noticed nothing abnormal about his stools and urine. No pruritus, no pain. He is of a healthy family, with no history of icterus. On examination he presented the brownish-yellow colour, characteristic of hæmolytic icterus. Scleræ yellow. Mucous membranes anæmic. Pulse normal. No glandular swelling. Heart and lungs normal. Liver somewhat enlarged, normally smooth. Spleen very large and consistent, extending to the median line. In the urine an excess of urobilin, no bilirubin. Examination of the blood revealed that the hæmoglobin content was 40; erythrocytes 2,280,000, leucocytes 10,000 (7000 polymorphonuclear). There was polychromatophilia, a good many normoblasts, a great many cells with Jolly-Howell's corpuscles. With vital staining 50 per cent. of the erythrocytes exhibited the so-called vital granulation of Fiessinger. The patient's serum was bright yellow, and had a bilirubin content of 1 : 30,000. The direct diazo-reaction of Hymans van den Bergh was negative. The amount of urobilin secreted in 24 hours per rectum was 3 g. (normal ca. 150 mg.). All the symptoms pointing to excessive hæmolysis were therefore present. The resistance of the erythrocytes to hypotonic salt solutions appeared to be considerably reduced; already with 0·7 per cent. NaCl hæmolysis took place.

Discussion.

All went to show that here also we had to do with a hæmolytic icterus, whether acquired or inherited could not be decided from the anamnesis. The clinical aspect favours the latter view. Furthermore, it appears from the blood picture that the bone-marrow was highly active in combating the anæmia generated by the increased hæmolysis; the anamnesis shows us that in the past this action had been successful, but in the last few months the bone-marrow apparently failed in its task. In both patients the question arose what had to be done: Would *extirpation of the spleen* be the proper treatment?

When Chauffard published his first observations on hæmolytic icterus he believed it to be a harmless disease that entailed hardly any suffering, and did not require any therapeutic measures: "Ils sont plus ictériques que malades." In fact, most of the cases are harmless, and slightly icteric patients with an increased hæmolysis, which is entirely compensated by the bone-marrow, can live their lives in pretty good health, without complaints worth mentioning. However, there are cases like those mentioned, in which the destruction of the blood is such as to put too great a strain upon the bone-marrow, be the latter ever so active.

Extirpation of the spleen may result in a considerable abatement or the total disappearance of hæmolytic symptoms. Indeed, for Addison's anæmia (the so-called pernicious anæmia) extirpation of the spleen has often been recommended as the proper therapy. In this affection, however, anticipations have been falsified, as the patient soon relapses into his former condition. Records of extirpation of the spleen in hæmolytic icterus are still few. There are cases, however, that lead us to expect better results than in pernicious anæmia. In either case hyperplasia of the bone-marrow exists; in hæmolytic icterus it should seem that this is the only change of the bone-marrow, so that we have good reason to expect that the bone-marrow may be completely restored, when the increased hæmolysis is abolished.

Treatment by Splenectomy.

As we feared a fatal issue in our cases without intervention, extirpation of the spleen was decided on.

The first patient was operated upon in July, 1922. The removal of the enlarged spleen was easily accomplished. Under the microscope it exhibited all the features familiar to us in conditions of increased hæmolysis (everywhere numerous erythrocytes outside the vessels, phagocytosis of erythrocytes, high endothelia of the sinuses of the venæ). The patient recovered well from the operation and soon after regained her health. The icterus and anæmia disappeared. Six months after the operation the hæmoglobin content appeared to amount to 75, erythrocytes 4,800,000, leucocytes 12,800, thrombocytes 300,000. The blood preparation no longer contained normoblasts, nor was any polychromatophilia distinguishable; there were, however, a few cells with Jolly-Howell's bodies. The indications of increased hæmolysis had disappeared; in the urine only a trace of urobilin was demonstrable; the bilirubin content of the serum was now 1 : 250,000, which is practically normal.

When determining the resistance of the erythrocytes to hypotonic salt solutions, I was struck by the fact that it had not been modified by the operation. Three years after operation patient was again examined. She still enjoys perfect good health. On examination the blood was quite normal; the resistance to hypotonic salt solutions, however, was the same as prior to the operation.

The second patient was operated upon in the beginning of 1924. The operation was uneventful. In the enlarged spleen we noted the same microscopic changes as in the first case. A month after the operation the hæmoglobin content was still 40, two months later 70, three months later from 80 to 85. Then the erythrocytes numbered 4,900,000. A slight leucocytosis of 10,000–15,000 still persisted. After two months there were no normoblasts, no polychromatophilia, a few cells showed Jolly-Howell's bodies, while the number of erythrocytes with so-called vital granulation had become normal (3 per cent.) After three months the marked urobilinuria had much improved, but urobilin was still demonstrable in the urine. The bilirubin content of the serum, which amounted to 1 : 30,000 ante-operationem, now appeared to be 1 : 200,000. There was an excretion of almost 1 g. of urobilin per rectum every 24 hours (ante-operationem 3 g.). This pointed to considerable improvement, although the values obtained were not yet normal. Just as in the first patient, the resistance of the erythrocytes to hypotonic salt solutions remained unaltered.

I saw the patient again lately. He looked and felt quite well and there was not a vestige of icterus left.

Results of Operation.

In both patients extirpation of the spleen has yielded the favourable results we had anticipated. It is interesting to discuss what the further prognosis will be. In my judgment the increased fragility of the erythrocytes should not be regarded in all cases in a similar way. In the literature cases are on record in which the symptoms cannot be due to the spleen, while in others the extirpation of the spleen caused the symptom to disappear altogether. May it be possible that the prognosis of the operated cases depends upon this? I mention from the literature a case of Banti, reported ten years after the extirpation of the spleen, in which the favourable condition had maintained itself; here the lowered resistance of the erythrocytes which existed before the operation had given place to normal values. It is not without the bounds of probabilities that we may learn from a wider experience that the persistence of the less resistant erythrocytes may lessen the chances of lasting benefit from the operation. It is notorious that in pernicious anæmia after splenectomy other organs can bring about the increased blood destruction. The danger is not imaginary that in the long run, perhaps after years, the less resistant erythrocytes, which continue after splenectomy in cases of hæmolytic icterus such as the above described, may in this disorder be the cause of a reappearance of the increased hæmolysis.

A CASE OF EXCEPTIONAL HYPERGLYCÆMIA WITHOUT COMA.

BY E. BOSDIN LEECH, M.D. CAMB.,
HONORARY PHYSICIAN, MANCHESTER ROYAL INFIRMARY;
AND
GARFIELD THOMAS, M.SC. MANCH., A.I.C.,
SECOND ASSISTANT TO THE DIRECTOR OF THE CLINICAL LABORATORY AT THE INFIRMARY.

IT would seem of interest to put on record the following case of diabetes mellitus in which the patient was not comatose and yet had in his blood a concentration of more than 1 per cent. of reducing substances (estimated as glucose).

On Nov. 4th, 1924, H. E. T., a male, aged 27, attended the out-patients' department of this hospital complaining of excessive thirst, weakness (he had walked to the hospital, but was very faint on arrival), blurred vision, especially in the right eye, and frequency of micturition. He was quite rational and stated that he had felt weak for about three months and that at times he had been very unsteady on his feet. He added that the excessive thirst had been noticed only during the week just past, and that on account of the parched state of his mouth he had been feeding, during that time, on "bread and milk."

Condition on Examination.—The tongue was found to be very dry; the pupils of the eyes reacted to light and accommodation, and there was no diminution of visual field; acetone was not noticed in the breath. The urine had a specific gravity of 1030; it contained a large amount of sugar, a trace of acetone, no aceto-acetic acid, and no albumin. In attempting to estimate the blood-sugar by the MacLean method it was found that, when 10 c.cm. of the filtrate were used, the volume of N/400 thiosulphate required was less than 1 c.cm.

It was decided that the patient should be admitted at once, but, at his special request, he was allowed to return home before entering the ward as an in-patient. On his return a couple of hours later it was found that during this interval he had taken more "bread and milk." The blood test was repeated in duplicate (using only 5 c.cm. of the filtrate for the estimation of the sugar) and the concentration of sugar was found to be 1·2 per cent. In the ward drinks were given freely. During the first 24 hours insulin was not given; dieting was at the rate of 560 calories per diem (made up of carbohydrate 26·5 g., protein 54 g., and fat 26·5 g.). By 10 o'clock on the following morning the blood-sugar had fallen to 0·335 per cent.; the breath then smelled strongly of acetone, but the urine contained no aceto-acetic acid. At midday 10 units of insulin were given and the diet was increased to 1450 calories per diem (made up of carbohydrate 46 g., protein 52 g., fat 117 g.). On the following day 5 units of insulin were given, morning and evening, and the diet was not changed. This was continued for a week; the clinical data collected during that time are set out in the table.

Date in Nov., 1924.	Diet in cals.	Total insulin per diem.	Pulse.	Blood-sugar %	Urine.*		
					In oz.	Sp. gr.	Sugar.
		units.					
4th	560	10	64	1·2	150	1030	+++
5th	1450	10	80	0·335	33	1036	++
6th	1450	10	80	0·188	36	1036	++
7th	1450	10	80	0·109	56	1032	++
8th	1450	10	84	not est.	76	1030	+++
9th	1450	10	88	,,	43	1036	+++
10th	1450	10	84	0·130	70	1036	+++
11th	1450	10	—	0·156	—	—	—

* Albumin nil. Aceto-acetic acid was absent until Nov. 9th. It was present (++) on the 10th.

The temperature varied between 97° and 98° F. It is unfortunate that the patient had to be discharged from hospital because he would not keep to the diet prescribed for him. He cannot now be traced.

LEEDS CAMPAIGN FOR SMOKE ABATEMENT.—At the request of the Health Committee the medical officer of health for Leeds has issued a circular letter urging on shopkeepers, occupiers of offices, and proprietors of large professional buildings the necessity of the entire abandonment of the use of raw coal and the adoption of smokeless methods of obtaining heat. It is stated that the change could be effected at a comparatively small cost, and the extra expense would be amply compensated by the results.

Medical Societies.

LIVERPOOL MEDICAL INSTITUTION.

AT a meeting of this Institution held on Dec. 17th, 1925, Dr. WALLACE JONES contributed a note on the

Prognosis of Auricular Fibrillation,

based on the analysis of statistics of a series of cases attending the Heart Department at the Royal Infirmary. The dominant factor in prognosis was the condition of the heart muscle. Information with regard to this would naturally group itself into (1) clinical evidence, (2) electrocardiographic findings. The symptoms accompanying the onset were very important and, when marked, indicated limitation of the reserve force of the heart and in consequence considerable myocardial damage. The investigation was made to determine the expectation of life from the time when the cases first presented themselves with symptoms of cardiac failure in the Heart Department until they died. It was shown that auricular fibrillation in these cases was more serious in senile than in rheumatic heart disease; that in mitral stenosis the expectation was slightly lengthened by the presence of auricular fibrillation, while in aortic regurgitation this effect was more marked. The prognosis was better in females than males in all types. In the electrocardiographic findings the presence of a bizarre Q.R.S. was of serious significance.

A joint contribution on

Sterility due to Impalpable Tubal Defects,

by Prof. W. BLAIR BELL, Dr. R. E. ROBERTS, Mr. J. ST. G. WILSON, and Dr. S. B. HERD, was introduced by Dr. Herd, who outlined the accepted methods of treatment for sterility in the female, and showed how frequently useless vaginal operations might be performed. As a method for controlling surgical treatment, and avoiding unnecessary operations, the adoption of the tubal patency test by insufflation was held to be of great value. Reference was made to the work and methods of Rubin, Dickinson, Forsdike, and Blair Bell, and a description given of the technique and apparatus employed by the latter—a hand-bulb with reservoir manometer and cannula being used, and air the material employed. Thirty-one cases were tested in this way, and in none of these was there any serious discomfort or disability. Radiological examination was always employed, and in all cases operated upon the previous diagnosis as to the state of the tubes was confirmed. Insufflation was only used for diagnosis, and it was not claimed that the method had any therapeutic value.

Dr. R. E. ROBERTS gave an account, with illustrative skiagrams, of the radiological features in the diagnosis of

Patency of the Fallopian Tubes.

The uterus having been insufflated, any air which has passed through the Fallopian tubes will tend to rise to the highest point in the peritoneal cavity, this point depending on the position of the patient. After the uterine insufflation the patient is therefore made to sit up or stand, and after a short interval in which the air has opportunity to rise in the peritoneal cavity an X ray examination is made of the diaphragmatic and hepatic area in the erect position, a skiagram being invariably taken. If the Fallopian tubes are both occluded no air will have entered the peritoneal cavity and the upper border of the liver cannot be differentiated from the diaphragm. If, however, one or other Fallopian is patent and air has entered the peritoneal cavity by this route, the air will have risen to the under surface of the diaphragm and will be shown in the skiagram as a translucent area between the diaphragm (which appears as a delicate curved line) and the liver, the extent of this translucent area depending on the amount of air which has passed in. Even very small quantities of air can,

as a rule, be demonstrated by this method, but it is conceivable that if the tubes are almost occluded the amount of air entering the peritoneal cavity would be so small that it might become entangled in the mesenteric folds and so fail to reach the subdiaphragmatic area.

Mr. ST. G. WILSON was of opinion that inflation was most suitable for cases of "one child sterility" when several years had followed last confinement. Inflation alone cannot always be relied on for a correct result, and he therefore advised injection with lipiodol in all cases which gave negative results with inflation. The clinical signs of passage of air through the tubes were unsatisfactory; he therefore always recommended the help of the radiologist.

Reviews and Notices of Books.

TUBERCULOSIS OF THE HIP.

The Diagnosis and Treatment of Tuberculosis of the Hip. By G. R. GIRDLESTONE, B.M. Oxon., F.R.C.S., Hon. Surgeon, Wingfield Orthopædic Hospital, Oxford. London: Humphrey Milford, Oxford University Press. 1925. Pp. 94. 8*s.* 6*d.*

IN a small volume, well illustrated by skiagrams and agreeably written, Mr. Girdlestone describes the every-day work of a country orthopædic hospital in connexion with the diagnosis and treatment of tuberculous disease of the hip. The opening chapter, which deals with the preliminary diagnosis in the doctor's consulting-room or on his round, contains an exhortation that not only definite but atypical cases should be sent at once to an orthopædic clinic or out-patient department of a general hospital. No one with an extensive experience of this disease will dispute the wisdom of this advice, for a good functional end-result depends on the prompt application of constitutional and appropriate local treatment. The local treatment recommended varies according to the stage of the disease. For the first stage, that of activity, the Jones abduction frame is recommended and ambulatory methods are very properly condemned. Operation has no place in the treatment of children, but the author believes that adults, in whom sound fibrous or bony ankylosis is the goal, require arthrodesis whenever radiograms show definite lesions but not conditions favourable to ankylosis. In the second stage, which is defined as commencing three months after fever has ceased and satisfactory improvement has been shown by gain of weight and an appearance of returning health, it becomes necessary to decide whether to aim at a movable or a fixed hip. Mobility is aimed at when during a test period of weight and pulley extension the movement of the joint gets freer week by week. Ankylosis is the objective when radiograms or tests show that without ankylosis the limb is unlikely to become permanently safe and useful. It is easy, the author remarks, to fall between the two stools and end with either mobility that is not free enough in its range and firm enough at its limits to be safe, or with fixation that is not massive enough to be secure. He points out that weight-bearing joints are prone to osteo-arthritis, and of these the hip most seriously and most painfully; and that, whereas at every step the knee and ankle have to carry the weight of the body, the hip labours under such a mechanical disadvantage that it must bear twice that burden. If mobility is decided on as the aim of treatment, a weight and pulley extension is substituted for the fixed frame; if fixation, a plaster spica is applied which includes also the upper half of the thigh on the sound side. The third stage, defined as commencing three months after the beginning of the second stage, provided all signs of disease apart from sequelæ have disappeared, is treated, in the mobile group, by patten and crutches, then crutches alone, and finally sticks; in the fixation group, by plaster with patten and crutches, followed by plaster and crutches alone and eventually a modified single Thomas splint. In some cases it may take four or five years to achieve ankylosis. Sepsis is dealt with by drastic drainage operations and, if ankylosis is not occurring, excision of the upper end of the femur. The final section of the book is devoted to a critical consideration of end-results (we regret the absence of any statistics) and to a description of operations to correct malposition.

Altogether an admirable little book.

A MANUAL OF HYGIENE.

By Sir WILLIAM H. HAMER, M.D., F.R.C.P., D.P.H., and C. W. HUTT, M.D., D.P.H. London: Methuen and Co., Ltd. 1925. Pp. 821. 30*s.*

HYGIENE is defined in the new Oxford English Dictionary as "a department of knowledge or practice which relates to the maintenance of health." An author who would deal compendiously with this department of knowledge must cover an impossibly wide field, relating to almost every human activity and treating as of first importance sociological problems not directly falling within the province of the art of medicine or the sciences on which that art is founded. Clearly some limit to the application of the word must be observed. It is surprising and not a little confusing to those who have to mould their teaching practice in conformity with the requirements of sundry teaching and examining bodies to observe the varying conceptions as to what hygiene means. We are relieved of any doubt in the case of this book, for the preface definitely states that its purpose is to meet the needs of those seeking to obtain a Public Health Diploma. It is from this limited aspect that its value must be assessed. The book is described as being based on Hamer's Manual of Hygiene (1902) and, though a good deal of new material is added, many passages are identical with those of the original manual.

The first four chapters deal in turn with Air, Water, Soil, and Food, and the fifth on familiar lines with the Collection, Removal, and Disposal of Refuse. Dr. Duncan Forbes has rewritten the chapter on Dwellings, Schools, and Hospitals, and (the late) Dr. James Niven contributes chapters on Tuberculosis, Sanitary Administration and Law. Mr. Kenneth Walker deals adequately with Venereal Diseases and Dr. Kenneth Fraser with School Hygiene. In other chapters the subjects of Infection and Immunity, Infectious Diseases, Disinfection, Vital Statistics, Maternity and Child Welfare are discussed in sufficient detail, but the book is kept within a reasonable compass. A certain lack of homogeneity is inevitable as the result of collaboration and of attempts to join new work to old, but the balance is maintained and little new work of real importance is omitted. The preventive idea underlies the whole volume, but for the benefit of students for the D.P.H. this might have been more definitely stressed and illustrated in each particular section. For instance, space given to irrelevant information on fire prevention, in the chapter on "Dwellings," might well have been devoted to the relation, if any, between housing defects and health. The real problems, too, in connexion with the disposal of domestic refuse—namely, the encouragement of fly- and rat-breeding—although they are mentioned, are not sufficiently distinguished from the æsthetic and psychological questions invariably confused with them in the public mind.

We miss further any definite indication as to the value of coördination within one department of all the older and the new public health services. The extent to which specialisation within the public health service is necessary or desirable or dangerous is surely a question of first-rate importance to the prospective health officer. The chapters on Maternity and Child Welfare and School Hygiene, each good in themselves, contain little reference to the complementary service or to the importance of continuous supervision by the same officers of children from birth to the

age of leaving school. It ought to be brought more vividly to the notice of the public health student that the linking up of these clinical departments with the public health service is justified mainly by the opportunity it affords of studying disease and ill-health in the mass, perhaps pointing the road to reform, outside the province of medicine. It seems to us that a coördinating chapter might have been added with advantage, either as introduction or conclusion to the manual, and dealing with these questions, as well as the history of the growth of the service and its probable development.

The chapters on Infection, Immunity, and Infectious Diseases are quite admirable. Here the bearing of scientific and clinical knowledge on the prevention of disease is dealt with in a masterly way. The section on Tuberculosis is also excellent, though unnecessary space is devoted to the detailed bacteriological findings of Royal Commissions. These and the preceding criticisms are made because the study of public health covers such a vast field. Hence writers should aim at cutting down to the minimum the enumeration of disconnected facts and keep ever before the flagging mind of the student the underlying preventive idea which gives these facts their significance. Having criticised, we may add that this manual is one of the most useful books of its kind that we have examined. It presents well and clearly the type of knowledge which the health officer should have at his disposal, and is singularly free from printers' errors. The figure on p. 230 is inverted and we have failed to trace the reference in the index to Farr on p. 733. The system by which the names of writers have been selected for mention in the index is not quite obvious. For instance, the name Brownlee appears several times in the text but not in the index; indeed, the epidemiological work of this writer is, perhaps, deserving of more attention than the book gives to it. A complete bibliography at the end of each chapter would be a real undertaking, but if this procedure had been adopted the references at the foot of pages and in the index might have been dispensed with.

CRIPPLED CHILDREN.

The Care and Cure of Crippled Children. Scheme of the Central Committee for the Care of Cripples. By G. R. GIRDLESTONE (Oxford). London: Simpkin, Marshall, Hamilton, Kent and Co., Ltd.; Bristol: John Wright and Sons, Ltd. 1925. 6*d*.

ALTHOUGH it is not so stated on the title-page, we are informed by the Secretary of the Committee that this is a revised edition of Part I. of the booklet which appeared in 1924. Since that time progress has been made, so that a complete scheme, as described in this pamphlet, of central orthopædic hospital, country town or village clinics, and after-care has either been or is in course of being established in 20 out of the 40 English counties. Information is here given as to the efforts that are being made to cure cripples, prevent crippling, and look after the interests of patients after treatment is at an end. The steps necessary to establish a county or county-group scheme, as originally achieved in Shropshire by Miss Agnes Hunt, and in the group of Oxford–Bucks–Berks by Mr. Girdlestone and his associates, are clearly set forth, and ideal plans for a central open-air hospital and a village clinic are also furnished. This pamphlet cannot be too widely circulated, nor the work of the Central Committee for the care of cripples too well known. This society, the office of which is at Carnegie House, 117, Piccadilly, W. 1, is also concerned in obtaining industrial training for the cured cripple. In the area under the London County Council there is a number of special (cripple) schools for physically defective children, and organisations exist which undertake to secure training and employment suited to the needs of cripples after their discharge from such schools. There are similar schools in some of the large towns and counties, but by no means in all, and the committee is endeavouring to secure the same advantages for provincial cripples as those available in London. At present a difficult problem is presented to any surgeon in a country town or district who, having treated the deformity of a patient, is asked by philanthropists or relatives to tell them what can be done to train him or her to earn a living. In such a case application to the Central Committee should be made and will receive sympathetic attention.

HISTORIC SCIENTIFIC INSTRUMENTS.

Historic Instruments for the Advancement of Science. A Handbook to the Oxford Collections prepared for the opening of the Lewis Evans collection on May 5th, 1925. By R. T. GUNTHER. London: Humphrey Milford, Oxford University Press. 1925. Pp. 90. 2*s*. 6*d*.

Dr. R. T. Gunther, the author of this interesting little handbook, is well known as an earnest student of the history of early science in Oxford concerning which he has written three very charming volumes. Dr. Lewis Evans recently presented his magnificent collection of astrolabes, dials, and other scientific instruments to the University of Oxford, and this collection is housed in the Ashmolean Building, which has thus reverted to its original association with the study of science. The collection was opened on May 5th, 1925, and Dr. Gunther is its very able and enthusiastic curator. He begins his handbook with an account of Ashmole and the old Ashmolean Building. Then follows a guide to the Evans collection of astrolabes and portable dials. The astrolabe is an important instrument not only on account of its use in astronomy and navigation, but on account of the extreme beauty of workmanship which some of the specimens show, and also because it was the first scientific instrument to be described in English and that, too, by no less a person than Chaucer. His treatise is still the standard work on the subject, but without an astrolabe to which to refer it is somewhat difficult reading.

The Oxford collection also contains many fine examples of globes, surveying instruments, telescopes, mathematical instruments, and microscopes. Among the latter are a Marshall's microscope of 1693 and an exact replica of Hooke's microscope purchased at the Crisp sale in 1925. This was the instrument with which Hooke, for the first time in the history of mankind, saw cells. He cut sections of various vegetable tissues and noted the fact that the substances were made up of nothing but cells. Many other interesting instruments are included in the collection, notably the Orrery collection lent by Christ Church. Lord Orrery was a great nephew of Robert Boyle, and the collection contains two beautiful specimens of the astronomical instrument to which Orrery's name has been given. Dr. Gunther has a way of giving extraneous information which makes his handbook original; for instance, concerning theodolites he has a footnote: "The word theodolite is a favourite word with the composers of examination papers in which unusual derivations of words are asked. *Theodolite=theodelite*, a corruption of *athelida*, which was a corruption of *alhidada*." The alidad, we may add, is the index which turns on a graduated circle and so shows how many degrees are cut off. A simple instance is the hand of a clock.

OPERATING ROOM PROCEDURE.

For Nurses and Internes. By HENRY C. FALK, M.D., Assistant Attending Surgeon to the French Hospital, New York; Instructor in Surgery at New York University and Bellevue Medical College. London: G. P. Putnam's Sons. 1925. Pp. 385. 15*s*.

IN this little volume the author has endeavoured to supply a theatre sister with all the technical details she may require for her work. Commencing with a description of the operating theatre and its general

equipment, he goes on to describe in detail the personal preparation of all those engaged in an operation and the various materials required. The arrangement of instruments and their care are described in some detail, and an excellent chapter deals with the important subject of how to keep theatre supplies. The preparation of a patient and the posture required for different operations are briefly but adequately described. The remaining half of the volume is occupied by a series of brief descriptions of the more common operations of surgery. The whole volume is elaborately illustrated by sketches which give a neat and clear idea of the instruments used and the method of their use. The book is the best we have seen dealing with this subject; it should be valuable to the nursing staff of a theatre, and there are few surgeons who would not learn or be reminded of something from its perusal.

METABOLIC DISEASES.

Die Stoffwechselkrankheiten in der Praxis. By Prof. FRIEDRICH UMBER, Berlin. Munich: J. F. Lehmann. 1925. Pp. 163. G.M.3·60.

A SMALL work which seeks to bridge the gap between physiological research and its application in practice is always welcome. In Germany particularly, and to a lesser degree in this country, the war necessitated large-scale experiments in nutrition. It is true, as the author points out, that few entirely new conceptions emerged, but our previous knowledge was broadened and deepened. It is this extended knowledge that Prof. Umber presents to us. The thoroughness with which some of the subjects are treated may be gathered from the fact that some 90 pages are devoted to diabetes alone and to its treatment by insulin. This is, perhaps, symptomatic of a return to that interest in calories which for some time have been eclipsed by the more elusive if no less important accessory factors.

PHYSICAL CHEMISTRY.

A System of Physical Chemistry. By WILLIAM C. MCC. LEWIS, M.A. R.U.I., D.Sc. Liv., Brunner Professor of Physical Chemistry in the University of Liverpool. In three volumes. Vol. II.: Thermodynamics. Fourth edition. London: Longmans, Green and Co. 1925. Pp. 489. 15*s*.

THE importance of physical chemistry in medical and biological subjects has come more and more to the fore during recent years. In fact, medical students are now expected to be fully acquainted with the general principles of thermodynamics and their application to colloidal and allied phenomena. The necessary knowledge is usually sandwiched into text-books of physiology, whose authors tend either to assume a knowledge of the elementary principles of physical chemistry or else to enter into a wordy account of this subject not easy to follow. There are, of course, text-books of physical chemistry written especially for medical students. These are, for the most part, quite good, but they gloss over the really difficult sections, which are made much of in the bigger text-books of physiology. For example, Donnan's membrane equilibrium theory as applied to proteins and colloids occupies a very important place in physiology, yet these special books often ignore it altogether. The theory of the double electric layer also tends to be neglected, yet it is constantly spoken of by physiologists. Experience in teaching shows that whereas the medical student will follow the first law of thermodynamics, he has great difficulty in mastering the second. This is mainly due to the poor accounts in the books at his disposal.

The volume now under consideration deals with practically all those points required by the medical student. It opens with chapters on the first and second laws. These are admirably clear, and, in fact, contain just the amount of information required for biological purposes. Medical students would do well to read the first four chapters, even if they have to omit the mathematical section. The next chapters deal with deductions from the two laws—i.e., Le Chatelier's theorem, the phase rule, the clausius equatracte. A good summary is given of Donnan's work and its application by Jacques Loeb to colloidal behaviour. This is certainly among the most concise and accurate summaries of these important views that we have read. The theory of the ionic micelle is dealt with in rather a brief manner, and perhaps the work of the late Sir William Bayliss upon this point might have received more emphasis. We deal here only with the points of biological importance. These are so clearly dealt with that the book can be recommended to anyone working upon physiological principles. A sound knowledge of mathematics is essential to a thorough understanding, but a great deal of valuable information can be obtained if the mathematical parts of the book are ignored.

An Intermediate Text-book of Physiological Chemistry with Experiments. Third edition. By C. J. V. PETTIBONE, Ph.D., Associate Professor of Physiological Chemistry, Medical School, University of Minnesota, Minneapolis. London: Henry Kimpton. 1925. Pp. 404. 15*s*.

SINCE this work has reached its third edition it would appear to be a popular book in America, although it is little known over here. Prof. Pettibone's volume is an example of careful compilation, obviously the result of wide teaching experience. The ground covered is that customary to such books and no new features are added. The descriptions are all clear and accurate, but there are no distinctive points which make the volume of special value.

JOHN STEARNE, M. AND J.U.D.

By T. PERCY C. KIRKPATRICK, M.D., Fellow and Registrar, Royal College of Physicians of Ireland. Dublin: University Press. 1925. Pp. 23.

THIS work is an address delivered by Dr. Kirkpatrick in the Royal College of Physicians of Ireland on the occasion of the 300th anniversary of the birth of John Stearne, founder of the College. Stearne was born on Nov. 26th, 1624, at Ardbraccan in the house of his grand-uncle, James Ussher, then Lord Bishop of Meath, who was translated in the following year to the Archbishopric of Armagh. Stearne entered at Trinity College, Dublin, in 1639, at which date the studies were arts, philosophy, and the superior faculty of theology. In 1641 occurred the Irish Rebellion, when the Provost of Trinity fled to England accompanied by some of his students, among whom was Stearne. Ussher, who, we regret to say, was then residing in England, gave Stearne an introduction to Samuel Ward, Master of Sidney Sussex College, and in 1642 Stearne matriculated as a pensioner and in 1646 graduated as Master. In 1643 Cambridge came under the heavy hand of the Parliamentary Commissioners and Ward was ejected and imprisoned. Stearne remained under Ward's successor, but in 1649 went to Oxford in the train of Seth Ward, a cousin of Samuel Ward, who was incorporated at Wadham College and made Savilian Professor of Astronomy. Stearne retired to Bedfordshire, and in 1651 we find him, by an Order in Council, made a probationary Fellow of Trinity College, Dublin. Next year he was made a regular Fellow and started medical practice in Dublin. Where he had obtained any medical training is not clear, but presumably it was at Cambridge. The founding of the College of Physicians was upon this wise. In 1604 the corporation of Dublin had put up a building on the site of the present Trinity-street as a Bridewell "for putting idle persons to work." Sundry difficulties between the builder and the corporation led to the building being handed over to Trinity College for a school house, or rather a hostel for students. More

difficulties arose as to possession and other matters, and eventually Stearne obtained leave from the Fellows to use the hall as a College of Physicians, he to live there and to be responsible for the expenses of repairs and upkeep. This was in 1654, and in 1667 Stearne obtained a charter from the King naming himself President and associating 13 other doctors of medicine as Fellows. Two of these Fellows had most unusual names, the one Samuel Sciclamore, which we imagine to be a variant of the name Siclemore, and the other with the still more grotesque name of John Unmusique. Two years after the granting of the charter Stearne died, and with the end of his life ends Dr. Kirkpatrick's most interesting address.

FLOWER SCENT.

By F. A. HAMPTON, M.A., B.M., B.Ch. Oxon. London: Dulau and Co. 1925. Pp. 133. 6*s*.

THE particularly emotional effect of the sense of smell has long been recognised, and it is common to find that the recall of a smell will conjure up a scene or an episode in a more prompt and definite manner than any recollection of a sight or a sound. It is therefore a loss to exact scientific writing or psychological assertion that no one has yet been able to think out a categorical nomenclature of smells, so that odour can be written and spoken of in the same way that may be employed with regard to what is seen or heard. The effect of sounds can be estimated up to a point in respect of their loudness by arranging a scale of distances, and visual appreciation up to a point can be gauged in a similar way. True, the standards thus arrived at are only general, and when an actual impression has to be conveyed the personal equation counts for much, but none of the parties in any discussion know what they are talking about. When smell is concerned, however, an actual vocabulary fails us in ordinary life, there being no common acceptation of any classification under which smells can be arranged. The sense of smell has been the least cultivated of the senses, and it is just possible that, if the subject had received the same attention as hearing and sight, the classification of odours would have reached a higher scientific plane though it suffers from the absence of the mathematical analysis which can be employed in optics and acoustics.

Dr. Hampton, dealing with the odour of flowers and their leaves, and taking into consideration its purpose and relation to man, has gathered together many interesting theories and facts with reference to the various scents of plants and presents them in a simple and coherent way. Pointing out that the scent of flowers and of most leaves is usually due to odorous volatile matter, he preludes his classification by chapters on the chemical composition of the active substances which produce scents, and their development and distribution as such. He quotes Count Kerner von Marilaun's classification made over 20 years ago, and points out the directions in which this is unsatisfactory, later chemistry having proved it to be partially unsound; and he proposes a modified classification, which he calls tentative and rough, but which will prove very interesting not only to lovers of flowers but to medical men. For many of us must at different times have been embarrassed in the attempt to find an adjective which suits an odour. The book, though small, is the result of wide reading to which references are given throughout at the close of each chapter.

NEW VERSE.

By ROBERT BRIDGES. Clarendon Press. 1925. Pp. 88. 6*s*.

THIS is a slender volume by the Poet Laureate, who is also a physician, as we are all proud to remember. It is composed of verse written in 1921 including a few earlier pieces, and a short preface explains the arrangement according to which the author has grouped what he calls "the distracting variety of this booklet." The poems in the first section are in Neo-Miltonic Syllabics, and the section is intended to make appeal to the advocates of free verse so that rigid scansionists must not expect to find it easy to make the right number of syllabic stresses. The second part is in Accentual Measures, concerning which controversy has now died down. Part III. presents no technical difficulties of metre to the ordinary reader, and for that reason will contain favourites for most of us; we can all understand from one poem or another how Dr. Bridges exercises his charm and to the close reader there will become apparent how far that charm depended on "the glow of a fire that burned steadfastly within." Part IV. consists of three short pieces, a translation from "Sappho," a pessimistic ode to Sir Thomas Barlow, and a vigorous denunciation, inspired by Catullus, of

> "a filthy skunk amongst us,
> A rank musk-idiot, the filthiest skunk."

Our medical Poet Laureate is not afraid of speaking his mind, but we wish he had not been moved to bracket his two predecessors in official bardery, for identity of Christian name is the least possible form of common denominator.

Reports and Analytical Records.

BACTOL MORGENSTERN.

(E. H. SPICER AND CO., 72, WIGMORE-STREET, LONDON, W.1.)

THIS is a thick white emulsion with a faintly sweet flavour, the bottle containing 12 oz. When analysed the emulsion was found to contain 52 per cent. of heavy petroleum, a very small quantity of agar, and probably a trace of saccharin. The remaining 47–48 per cent. was water.

Bacillus acidophilus is said to be present (over 250,000,000 per c.cm.); it grows freely in alkaline media, the end product being lactic acid. It is claimed to create in the intestines a hydrogen-ion concentration which is antagonistic to the development of putrefactive bacteria. Whilst *B. bulgaricus* cannot establish itself in the intestinal tract and soon dies off, *B. acidophilus*, being a native of the bowel, rapidly re-establishes itself and multiplies freely in its normal habitat. Bactol presents the *B. acidophilus* in a stable form as it contains sufficient agar to maintain the viability of the bacilli and air is excluded by the petroleum. Bactol is thus superior to acidophilus milk and other cultures, which quickly spoil. It has the further advantage of obviating the necessity for the administration of large amounts of fluid preparations in order to attain "acidophilisation" of the intestinal tract.

ANTIPHLOGISTINE.

(DENVER CHEMICAL MANUFACTURING CO., NEW YORK CITY, U.S.A.)

The tin of antiphlogistine examined contained 10·5 oz. of a slightly aromatic pasty mass with a faint brown colour, which is used as an external application for inflammation and congestion. It is claimed to be a perfectly harmless, non-irritating, non-toxic dressing with hygroscopic and indirectly anodyne properties. It is always ready for use, and maintains its properties under any climatic conditions. When analysed it was found to consist of 55 per cent. of inorganic matter of an argillaceous character. This was associated with glycerine, boric acid, and traces of iodine. The aromatic oils of peppermint, eucalyptus, and gaultheria are also said to be present. Antiphlogistine is a carefully prepared material, and is of undoubted use as an external application in a great variety of inflammatory conditions. Owing to the glycerine present, it keeps the tissues in a moist condition, and its antiseptic properties enhance greatly its general usefulness.

THE LANCET.

LONDON: SATURDAY, JANUARY 2, 1926.

THE PUBLIC IMPORTANCE OF MEDICINE.

THE general manner in which thoughtful persons regard New Year's Day as an opportunity for stock-taking should make us all, in the medical profession, look along the course of the year just gone to see if any experiences in the immediate past can be registered which will have their influence upon the activities of the present and the future; though too much stress must not be laid upon such revision, for we may be led into error if we regard separate years as isolated periods rather than as arbitrary divisions of continuous time. No one really thinks that the embarrassments of one year disappear with the dawn of the next, and if this is easily seen in relation to medicine when comparing progress in two consecutive years, it is confirmed by contrasting with each other larger lapses of time, like quinquennial or decennial periods. The fuller data thus obtained are accompanied by the disappearance from consideration of many matters which looked important at particular moments, leaving us freer to consider which of the greater legacy charges of the past should be paid in full with as much promptitude as possible, so that the assets which remain shall fructify in due season.

If we were to say that the calling of medicine is now passing through an anxious phase we should be repeating words which must have occurred in many previous New Year messages, and it is wholly to the credit and honour of our profession that these phases should recur constantly. For thus it is shown that the underlying difficulties of medicine vary with the general progress of civilisation, as international, national, and social developments put upon medicine new responsibilities and strains. While the anxious phases come again, their origins vary perpetually. If we were compelled to bewail abiding troubles we should be confessing to inability to cope with them, and there is no necessity whatever for such a confession. To find that in a fresh direction the medical profession has obstacles to overcome, has interests to collate, has prejudices to remove, and has work to be done, is to find that medicine is playing its prominent and intimate part in the life of all society alike as a developing and as a moral force. The importance of medical issues has been particularly well displayed during the year by the mass of evidence which has been laid before the Royal Commission on National Health Insurance. The evidence, though given during the year, should be estimated in regard to all that followed upon the passing of the Insurance Acts, for in that way we can discriminate between the greater and the smaller issues. It has been our care to summarise this evidence from week to week so that the greater issues may emerge, and it must be remembered that all proposals made before the Commission on behalf of the medical profession form an indication of the lines on which a National Health Insurance scheme should go forward, rather than suggestions that any particular reform can be made practicable at the moment. This is well shown by the manner in which the big question of the dependants of the insured has been discussed; here opinion in the medical profession on the question of the inclusion of dependants in the insurance scheme has been divided and the evidence has necessarily taken the form of a compromise, where the ayes and the noes can agree with each other over many portions of the dividing line. It has become clear that on the side of the Approved Societies nothing has been put forward justifying a clear demand for drastic procedure. The introduction of a wage-limit as a test for suitability to receive medical benefits is another great subject which has not been definitely settled. Before the war the difficulties of applying any practical income-limit for manual workers were found insuperable, and from the proceedings before the Commission it would seem hardly likely that the Insurance Acts can be revised immediately so as to apply an income-limit for manual workers, who constitute the vast majority of the insured population; while as far as dependants of the insured are concerned at the present time it is not, we believe, in the region of practical politics to attempt such a development. Wholesale admission of dependants is impossible, and we must remember where any partial treatment of the subject might lead. Here are two great questions which concern a substantial portion of the medical profession personally, and which deeply affect the ideals of all. They remain for settlement while many lesser matters have settled themselves. As a definite development in the whole Service allusion may be made to the culmination of a series of negotiations with the Ministry of Health under which there has now been drawn up a list of 600 practitioners throughout the country who are regarded as ophthalmic specialists, and who are willing to treat insured persons at a uniform fee of a guinea to cover each case of refraction. These points in the deliberations of the Royal Commission on National Health Insurance are singled out for mention as proving the comprehensive and also the detailed manner in which the inquiry is being held, and as showing that, while from time to time there may be no particular progress to be registered, vital changes of heart may be observed in the mutual attitude towards each other of the State on the one hand, and on the other of the beneficiaries and the executive under the National Insurance Acts. To appreciate this forms a gratifying result of stocktaking.

Looking along the developments of National Health Insurance, to see how far past experience and accomplishments indicate the more urgent work ahead, it becomes sufficiently clear that the time has come when the relation between medicine and the public should be better understood; for where clear explanations of medical ideals can be framed a great deal of public criticism will be obviated, to the immense benefit of the country. We have always considered it a fine testimonial to the influence of medicine that day by day the medical side of common affairs makes more frequent appearance in the public comments of the press and in the conversation of men and women. While it must be the policy before the medical profession to ensure that the conditions of medical practice should be such that the nation can obtain full scientific value from our efforts, the fact should be openly admitted that in many directions medicine is prepared to delegate technique, while retaining that general authority which is conferred upon practitioners by a course of arduous training guarded by stringent tests. During the close of last year the lay newspapers gave evidence that, while the public was prepared to acknowledge the development of medical science, it resented what it considered to be an attempt to reserve to qualified practitioners forms of treatment ancillary to medicine which could be rendered as well by the unqualified. Much of this criticism was misdirected owing to the

complete misunderstanding, not only of medical ideals, but of the Acts of Parliament under which the profession of medicine is carried on. But, as we have said above, the medical profession has always had similar difficulties to surmount; it is a proof of its development that they should manifest themselves in various forms, and of its vitality that progress has been steadily maintained as the barriers of prejudice have been removed.

THE OVARIAN HORMONE.

THE historical aspect of researches upon the ovarian hormone is of considerable interest; those who search carefully among the mass of material published on the subject will find that a great deal of accurate scientific work has been done. That the ovary is connected with secondary sexual characteristics has been known for hundreds of years, but it was not until the end of the last century that substitution therapy was attempted. THEODORE LANDAU [1] was the first to administer ovarian preparations by the mouth to patients who had been subjected to the operation of oöphorectomy. It is a striking fact that LANDAU never attempted to control his observations by animal experiments; in fact, 12 years of solely clinical research elapsed before ADLER [2] published an account of his animal experiments. In 1912 this observer stated that by injecting watery extracts of ovaries into animals he was able to produce all the symptoms of natural œstrus. From 1912 onwards a whole series of papers appeared on the subject, but it was obvious that the difficulties of standardisation were very great indeed. The methods used for this purpose consisted in injecting normal or spayed animals, and noticing the onset of signs of œstrus, such as enlargement of the genitalia, and symptoms of rut. The preparation of the active material had reached a very high pitch by 1915. ISCOVESCO (1912) [3] first suggested the use of alcohol as an extractant, and FELLNER,[4] SEITY, WINTZ, and FINGERHUT [5] carried on this line of work. Undoubtedly the finest piece of research on these lines was that done by HERRMANN and FRÄNKEL [6] in 1915. These workers evolved a very sound method for the preparation of the product, and controlled their work by careful animal tests. The method consisted in a preliminary extraction of the ovaries with alcohol, and this solution was evaporated down. The solid residue was extracted with ether, and the phosphorus and nitrogen containing lipoids were precipitated from this solution by the addition of acetone. The final oily product was obtained by evaporating this solution to dryness. HERRMANN and FRÄNKEL studied the chemical and physiological properties of this substance very fully. Their brilliant researches lay dormant in the literature until 1923, when ALLEN and DOISY [7] fully confirmed the greater part of HERRMANN and FRÄNKEL'S claims. They were able to check their results much more accurately than HERRMANN and FRÄNKEL, since they adopted the method of STOCKARD and PAPANICOLAOU [8] for diagnosing the onset of œstrus. This consists in noting the alteration in the cell picture of vaginal smears during œstrus. ALLEN and DOISY, using a method almost identical with that of HERRMANN and FRÄNKEL, succeeded in producing artificial œstrus in their test animals. The former hold the view that the active principle is located solely in the Graafian follicles, and not in the stroma of the ovary.

DICKENS, DODDS, and WRIGHT [9] have repeated the work in this country, and have succeeded in confirming the observation that active material can always be obtained from fresh ovaries. The method of preparation used by them consists of slight modifications of those employed by HERRMANN and FRÄNKEL, and ALLEN and DOISY.

Pigs' ovaries were used as the main source of supply. The minced tissues were extracted with twice their weight of alcohol, care being taken not to lose any fluid during mincing. After stirring, the mixture was pressed out in a hand press through jean, and the solid material was then extracted in a Soxhlet apparatus with alcohol for 6–9 hours. The alcoholic extracts were then combined and filtered through Chardin papers. The filtrate was evaporated almost to dryness in vacuo, and the residue was taken up in a small volume of alcohol and filtered. On standing, a precipitate of fats and cholesterol separated which was removed by filtration. The solution was again taken down to dryness, and the residue was dissolved in a small quantity of ether, and twice its volume of acetone was added. The precipitated lipins were filtered off. The solid material was then redissolved in ether and again precipitated with acetone. This process was repeated several times. The filtrates were then combined and evaporated to dryness. The residue was dissolved in a small quantity of alcohol, and some cholesterol was removed by freezing. By repeating this process, it is said that the greater part of the cholesterol can be removed. The final product is obtained by distilling off the alcohol in vacuo.

Of a series of commercial preparations tested by DICKENS, DODDS, and WRIGHT all proved inactive. One specimen of whole ovaries, dried at 40° C., was found to yield 150 rat-units per kg. by the above method of extraction. The active principle consists of a clear, light brown oil, readily soluble in alcohol, ether, acetone, and olive oil. It can be heated to 200° C. without loss of activity. It withstands saponification only to a limited extent. The ovarian extracts made were standardised by the method used by ALLEN and DOISY—i.e., by determining the minimum amount which will bring about artificial œstrus in oöphorectomised adult animals as judged by STOCKARD and PAPANICOLAOU'S smear method. Rats were used almost exclusively. The extracts were injected subcutaneously, dissolved in olive oil or suspended in weak bicarbonate solution. If the extract was active, œstrus appeared sometimes after 24 hours and usually within 36 hours of the time of injection. The responsiveness of the animals was found to wear off with the lapse of time after oöphorectomy and larger doses became necessary for the production of œstrus. Thus 12 mg. of a liquor folliculi extract produced definite œstrus in a freshly spayed rat, while 50 mg. produced only slight pro-œstrus in a rat spayed three months previously. It must be remembered that three months correspond to 30 œstrous cycles in the rat, which is equivalent to two and a half years in the human female. After three months the genital organs of oöphorectomised rats are very thin and

[1] Landau, T.: Quoted by Novak, E., Endocrinology, 1922, vi., 599.
[2] Adler, L.: Arch. f. Gynäk., Berlin, 1903, lxviii., 438.
[3] Iscovesco, H.: Compt. Rend. Soc. de Biol., Paris, 1912, lxxiii., 16.
[4] Fellner, O. O.: Arch. f. Gynäk., Berlin, 1913, c., 641–719.
[5] Seity, L., Winty, H., Fingerhut, L.: Münch. med. Woch., 1914, lxi., 1657, also 1734.
[6] Herrmann, E., Fränkel, S.: Monatsschr. f. Geburtsh. u. Gynäk., 1915, xli., 1; and English Patent 113,311, Feb. 13th, 1918.
[7] Allen, E., Doisy, E. A.: Jour. Amer. Med. Assoc., 1923, lxxxi., 819.
[8] Stockard, C. R., Papanicolaou, G. N.: Amer. Jour. Anat., 1917, xxii.,
[9] Dickens, F., Dodds, E. C., Wright, S.: Biochem. Jour., 1925, xix., 853.

resemble fibrous cords. The effect of the preparation was also tested upon a female monkey; 100 mg. were injected subcutaneously, and within three days typical menstruation commenced. That this response was not the onset of a normal period was excluded by previous observations upon the animal. In a series of experiments in which the extract was administered by the mouth to oöphorectomised rats, œstrus could not be induced even when very large doses were given. By means of a series of injections an oöphorectomised rat was kept in a state of continuous œstrus for a period of 14 days. DICKENS, DODDS, and WRIGHT were unable to support the theory of ALLEN and DOISY that in the ovary it is only the liquor folliculi that contains the hormone. They also describe experiments to show that the active principle inhibits the blood-sugar lowering effect of insulin to a fair extent.

We have, therefore, two independent confirmations of the work of HERRMANN and FRÄNKEL, and it will be interesting to see how long it will take before active material appears on the market. Experiments of the observers already mentioned have conclusively shown that (*a*) fresh ovaries alone will yield active material, ordinary dried specimens being useless unless specially treated; and (*b*) the preparation is quite inactive when given by the mouth. In view of these findings, the inconclusive and contradictory results reported as to the therapeutic value of ovarian extracts given by the mouth are not surprising. Such success as has been recorded from oral administration of these extracts is presumably due to some other cause. The large-scale production of standardised active extracts will now be awaited by gynæcologists and physicians with eagerness.

THE BRITISH SOCIAL HYGIENE COUNCIL.

THE year which has just closed has seen the National Council for Combating Venereal Diseases launching out on a broader programme of preventive education under a new name, thus bringing Great Britain into line with the Dominions, the Colonies, and the United States, where social hygiene councils already exist. When the National Council was established in 1914 there were certain reasons which led to the choice of the original name. The press as a whole never mentioned the words "venereal disease" and the public generally was ignorant of its heavy burden of preventable disease; nor were there more than the scantiest facilities for free treatment. It was necessary, therefore, to secure that infected persons should seek treatment and be able to obtain it easily. As far as publicity and the provision of treatment are concerned, the National Council has achieved its end, and it is now considered desirable to attack the problem by widespread educative propaganda. This it is thought, no doubt with justice, will be more easily accomplished under the new title.

It would have been an encouraging start for the new campaign thus instituted if fusion between the National Council and the Society for the Prevention of Venereal Disease could have been brought about. A liaison committee of the two organisations, however, failed to agree upon the question of advertisements in chemists' shops, and the Society for the Prevention of Venereal Disease decided that fusion would be impracticable. However, alternative means of coöperation have been devised and a permanent liaison committee, consisting of five members of the executive committee of each organisation, has been established to take such joint action as occasion suggests. Further, Sir AUCKLAND GEDDES, who was already President of the Society for the Prevention of Venereal Disease and had been chairman of the liaison committee, has accepted the presidency of the British Social Hygiene Council. An example of the coöperation now existing between these two organisations is seen in certain negotiations which have been proceeding during the year between them, acting jointly, and the Ministry of Health on the question of the chemist's shop. These relate to the sale by properly qualified chemists of disinfectants and instructions for use approved by some competent authority. The liaison committee urged that this should be allowed, but that display of prophylactic packets should be forbidden and that the only advertising allowed should take the form of an approved notice in chemists' shops where disinfecting materials are on sale. The difficulty immediately arising from these proposals, as pointed out by the Ministry of Health, is the question of the "competent authority" necessary for the satisfactory working of any such scheme. The Ministry itself will not act and the Medical Research Council will not undertake the work. The liaison committee had suggested that the Society of Medical Officers of Health should be approached, but this was also open to various objections, and it was agreed by all parties to be impracticable. The problem of the provision of a competent authority is therefore still to be solved, but it is a great step forward that the two organisations which have so long taken different views have been able to agree upon the recommendation of a single policy, and it is possible that the outcome of the negotiations will be a joint recommendation by these two bodies of persons to constitute the competent authority.

The work already accomplished by the National Council is summarised in its tenth annual report, just issued. It is gratifying to see that the number of new cases of syphilis presenting themselves annually for treatment has fallen since 1920 from 42,000 to 22,000. Since the number of attendances at the centres has actually increased, this probably does represent a real diminution in the number of fresh infections. On the medical side, therefore, the attack on venereal disease is progressing satisfactorily, but, as Sir AUCKLAND GEDDES said in his presidential address, "no mere medical attack on venereal disease will ever of itself achieve victory." The social and moral problems involved also call for solution. Many "health weeks" and other public health campaigns now make use of the Council's propaganda, and one important feature of the wider programme now adopted has been the appointment of a social hygiene committee, which includes prominent biologists, psychologists, and educationists to advise the Council on the preparation of a syllabus of lectures to cover the wider field. With the aims and objects now set out and the wide educative programme contemplated all workers in the field of preventive medicine will be in sympathy, and the fresh activities of the Council under its new title will be watched with interest.

WE regret to announce the death in LONDON, on Dec. 28th last, of Dame Louisa Aldrich-Blake, senior surgeon to the Elizabeth Garrett Anderson Hospital, and since 1914 Dean of the London (Royal Free Hospital) School of Medicine. Miss Aldrich-Blake was a pioneer among woman surgeons; she was the first woman to obtain the M.S. degree of the University of London and to hold the post of surgical registrar to the Royal Free Hospital. She was in her sixty-first year.

Annotations.

"Ne quid nimis."

ATMOSPHERIC POLLUTION.

THERE are now 48 stations in the British Isles at which the monthly deposit from the atmosphere is measured, and their records for the year 1924–25 may be found in the Eleventh Annual Report of the Advisory Committee to the Air Ministry on Atmospheric Pollution.[1] Compared with the average of the previous five years there is a slight improvement; for example, out of 33 stations for which full results are available, the total deposit was below the average in 21 and above it in 12, whilst the deposit of tar, which is a smoke product, was considerably reduced as compared with the average. Sulphates, one of the most injurious parts of the deposit, showed a slight reduction, and at 18 stations out of 30 there was less of them than usual. The largest amount of tarry matter was in Newcastle-on-Tyne, which also had the highest tar deposit for the five years' average. The figure given for annual solids falling on a London area corresponds to 461 English tons of material per square mile, and an interesting feature of the report is a discussion of the ætiology of the celebrated fog which is more or less affectionately called "the London particular." Experiments in London and the suburbs have shown that its development is due rather to the replacement of water particles by smoke than to the dirtying of the particles themselves. In the suburbs a dense fog contains a large amount of water and little smoke, but in London the water droplets are reduced considerably in number and are replaced by soot. This conclusion is important because it proves that London fogs are not (as is so often assumed) a natural visitation which it is beyond the power of man to prevent. The fact seems to be that in the absence of soot to take the place of water there would be less natural fog in London than in the surrounding country, since the air over the city is warmer than elsewhere, and therefore the water particles which cause ordinary fog tend to evaporate. One of the special features of the report is a chart of results obtained in London which brings out the effect of wind on the concentration of impurity and shows that the concentration is inversely proportional to the wind velocity. Wind velocities below two miles an hour in winter are often accompanied by dense smoke hazes. Several methods employed in measuring dust have recently been described in our columns,[2] and an account has been given of that devised by Dr. J. S. Owens. The report contains some interesting observations made by Dr. Owens with his instrument—the jet dust counter—at the mouth of the St. Lawrence River and in Southern Portugal. The air in both of these situations contained little but crystalline salt particles, which are hygroscopic and begin to form fog of liquid drops before the air becomes saturated.

THE EVACUATION OF SICK BY AEROPLANE.

IN their campaigns in Syria and Morocco the French have had to develop the transport of sick and wounded by air, and have gained much experience of what is now almost an essential service wherever casualties have to be evacuated from beleaguered garrisons or from posts on bad roads, in sequestered valleys, or on the other side of high mountains. In Morocco, where there have been over 11,000 French casualties during the year of fighting, the conditions have demanded the fullest possible use of aircraft under war conditions; but the use of air transport for carrying sick is also necessary in a country like Iraq, which is held, so to speak, from the air. British experience is by no means inconsiderable, as is shown by a contribution by Wing-Commander H. A. Treadgold, R.A.F.M.S., to the November issue of the *Journal of the Royal Army Medical Corps*, in which the achievements of the two countries are reviewed. Invalids from Iraq, he states, are now evacuated from Baghdad to Cairo in two days by air instead of in three or four weeks by steamer. The ambulance travels with the air mail, so that help may be available in case of accident, but no mishap has yet occurred amongst the 3000 cases moved. In the spring of 1923 198 cases of diarrhœa and dysentery were transported over the Aghdir Mountains from Suleimania (in the vilayet of Mosul) to Kirkuk—a distance of 100 miles direct, but at least 150 miles by road. The roads were poor, and on ponies the journey would have lasted a week, but the single transit by air was over for each patient in two hours. The cases were carried in Vickers-Vernon troop-carriers, which can take about ten men, with two stretcher cases. This means of transport is uncomfortable but swift, and the machines are available from ordinary troop-carrier squadrons. In addition to these, two other types of machine are available. In an emergency single cases can be carried quite comfortably by two-seater aeroplanes in Neil Robertson stretchers; they are wrapped up in special warm coats and strapped to the gun-ring and the outside of the fuselage. And there are now coming into use special ambulance aeroplanes (with larger engine-power, larger cabin, wireless, oxygen, body-warmers, and a w.c., with tank for dejecta), each of which will take two lying and four sitting cases. These will be drawn from special ambulance squadrons to be formed. To facilitate the evacuation of casualties the French troops make suitable landing-places immediately they occupy a new post, and this is very important. The best pilots are wanted for the service, but it is unpopular with them; they would rather be fighting. In order to combat this feeling the French Higher Command have put photographers, bombers, and pilots of medical aeroplanes on an equal footing for rewards. Good liaison is another essential factor. Pilots choose, in relation to weather and trip, a particular time for starting, and they cannot understand the unavoidable delays of medical officers, who in their turn fail to appreciate the reasons for the starting-time being so definitely named. This state of affairs seems to call for an Air Force embarkation medical officer and a small hospital close to the landing ground to receive and hold cases for embarkation.

EMBRYOLOGICAL MATERIAL.

THE importance of embryology and of the study of intra-uterine changes, both in the fœtus and in its surroundings, and the bearing of these details of development on problems of pathological interest, are matters that are being gradually realised within the medical profession. What is not realised, perhaps, is the possible greatness of the importance. The ordinary courses in embryology which are prescribed for the student would be laughable in their inadequacy if it were not that they give him, at any rate, reason for knowing that the human body is not a preformed thing, fixed from the beginning, but must bear within itself certain inherited qualities and their stigmata, so that when he has to consider some pathological problem he may perchance remember that there are other questions behind those arising in the post-mortem room and pathological laboratory, and this may lead him to seek for authoritative information about them. It is here, unfortunately, that he is very likely to find himself at a loss. There are problems in development that have never been touched and others that have hardly been considered at all. Human organogeny has been worked out with fair accuracy and completeness in its broader aspects, but the finer points and the interplay of factors in the production of results, and the nature of the factors themselves, are still to be done, and it is here rather than in the larger matters that pathology will be looking for help. To give a simple example

[1] Annual Report for the Year ending March, 1925, of the Advisory Committee for the Investigation of Atmospheric Pollution. Published by H.M. Stationery Office. 5s. 6d.

[2] THE LANCET, 1925, ii., 712.

of the differences referred to, the known stages of formation of the palate afford an explanation of the anatomical situation of the fissure, but not of the cause of a cleft palate. Here we want information on the factors which cause full growth of the maxillary process and on the causes of its failure in growth, and about these we know nothing. Such matters, more abstract and intricate, which do not come within the purview of the ordinary student, can only be slowly solved by those who devote their time to research of this sort, and they must depend for their material on the clinician, who alone is in the way of obtaining it. For this reason we should specially direct attention to the letter from Prof. J. P. Hill in our last issue. Embryologists can obtain specimens at all stages from most animals, but for human embryos they are forced to rely on the help of their practising colleagues. Much of the material procured in this way is abnormal, but that need not deter the practitioner from sending it, for the skilled study of abnormal formations may often throw light on dark places; it is of much more importance that its histological characters are fairly good, whence the attention to preservation asked for in the letter. The study of human embryology in England has hitherto depended on the use of private collections, and it is well to aim at the formation of a large and representative gathering of specimens, in which the help of the practitioner is essential, and surely will not be withheld.

ENCEPHALOMYELITIS AND DISTEMPER.

RENEWED attention has of late been directed to lesions of the central nervous system in connexion with canine distemper. A meningo-encephalomyelitis was described in 1908 by Batten and Holmes in canine chorea—a recognised sequela of distemper—and subsequently a number of writers have confirmed and elaborated their description. Dexler had already drawn attention to changes in the brain less definitely associated with distemper. In 1923 and 1925 Kantorowicz and Lewy described the histological features of nervous distemper, and especially drew attention to the occurrence of groups of small bodies in the brain and cord, which they regarded as parasites and to which they attributed the morbid condition. These bodies are undoubtedly from their descriptions of the same nature as those which Craighead and Wright found in the brain of rabbits, and which have since been found in the brain and kidneys of rabbits and mice, and were called by Levaditi *Encephalitozoon cuniculi* and regarded by him as a form of microsporidium and the cause of an encephalitis. Manouelian and Viala found somewhat similar forms in the brain of man and animals dead of rabies, and believed them to represent the virus of that disease. The nature and pathological significance of these bodies is still under consideration. In the September number of the *Buffalo General Hospital Bulletin* Messrs. Benjamin Roman and Chauney M. Lapp record the finding of inflammatory changes similar to those found by Batten and others in the central nervous system of 19 out of 29 cases of distemper (27 dogs, 1 cat, and 1 fox). In two or more of these 19 cases the clinical states were merely catarrhal, and nervous symptoms were absent. They suggest that a thorough search would reveal the typical lesions in the brain and cord in all cases of distemper. The changes which they described were very widely spread and patchy in distribution. They consisted chiefly of a lymphocytic effusion sheathing the small vessels and in some places surrounding the altered large motor nerve cells. The account given of the lesions in comparison with those of other forms of acute non-bacterial infective encephalomyelitis — e.g., encephalitis lethargica, herpetic encephalitis, poliomyelitis, Borna's disease and rabies—suggests that the histological changes in this group are very similar in kind, and are to be distinguished mainly by differences in their regional distribution and intensity. The last-mentioned authors regard the inflammatory changes as characteristic of distemper and probably constant in the different forms (catarrhal, intestinal, and nervous) of this disease. It may, however, be doubted whether, in the light of the recently discovered widely spread occurrence of similar lesions in several different kinds of animals, it is wise definitely to decide on the unity of a disease to which are attributed so great a variety of symptoms, until the experimental results of inoculating a purified or cultured distemper virus have been fully studied.

WATER-SUPPLY AND CHLORINATION.

AT a recent meeting of the Public Works, Roads, and Transport Congress, Mr. I. G. Gibbon, Principal Assistant Secretary, Ministry of Health, recommended local sanitary authorities, at any rate the larger ones, to have a policy of water-supply in general outline for 50 years ahead, and a detailed programme for 20 years. In areas where neighbouring authorities had a common interest, either in the source or in the supply of water, he suggested the appointment of regional committees to ascertain the needs of all parties and how these needs could best be met, leaving the actual decisions to the constituent authorities. At the same congress Sir Alexander Houston regretted the tendency of large towns to fight for the possession of far distant gathering grounds for water impounding purposes, irrespective of the needs of their neighbours or of the country as a whole. A map of England and Wales showing the appropriated gathering grounds and the far distant towns supplied from them would, he said, make a startling picture and an alarming one from the point of view of those who have not made adequate provision for the years to come—"the unwise virgins of the water world." This rush for the uplands arose from the wise belief that it is better to drink a water which requires no purification than a water which has been purified by artificial means to a high standard of perfection. But the matter is really pressing, for although much can be done to prevent waste the consumption of water is continually increasing owing to the increased use of water for baths, lavatories, and washing operations in general. Sir Alexander Houston therefore contemplates the necessity soon arising of utilising for domestic purposes waters of doubtful origin, and he supports his view by considerations such as these:—

1. The interpretation of the results of the chemical and bacteriological examination of waters has radically changed within recent years.

2. Great progress has been made in the methods of rendering impure waters apparently safe to drink.

3. We have ceased to be obsessed by purely sentimental considerations.

4. Our administrators are more alive to the advances in science, and less inclined to be bound down by past traditions.

5. Over one-seventh of the population of England has been, and are, drinking with impunity, highly purified water derived from sources of questionable origin. This may be described as a physiological, or pathological, experiment on a vast scale.

6. If the absence of *B. coli* from a water is to be taken as implying the absence of the microbes of water-borne disease this organism can be practically eliminated by storage and filtration, and, if chlorination processes are super-added, absolutely destroyed.

7. There have been cases abroad where the addition of chlorine to impure water, which had previously been responsible annually for an enormous amount of disease and death, has resulted seemingly in the almost complete elimination of water-borne diseases.

If on this evidence the need for special purification processes is accepted, a little booklet just issued in a fourth edition entitled "Water Sterilisation by Gaseous Chlorine" will be found of considerable value. The Paterson Engineering Company which issues it has been responsible for large installations both in this country and abroad. Such questions as super-chlorination and de-chlorination, taste problems, chloramine sterilisation, disinfection of swimming-bath water, treatment of condenser cooling water, control tests of treatment, and the like are lucidly dealt with. The importance of duplication of essential machinery, a point too often overlooked,

is strongly advocated. An emergency may readily arise in which a previously safe supply becomes suddenly polluted and unsafe. It is satisfactory to learn from the booklet that it is possible within 24 hours to have a chlorine apparatus installed and in working order. Solution of the chlorine in a minor body of water before addition to the main supply requiring treatment is the method advocated; this is much to be preferred to the addition of gaseous chlorine to the water through porous diffusers. Authorities contemplating chlorination, and their number increases daily, will benefit by the perusal of this little book.

ARSENIC IN APPLES.

SEVERAL Hampstead tradesmen were recently prosecuted for selling Jonathan apples containing arsenic in quantity sufficient to cause complaint of illness after ingestion.[1] The Ministry of Health has now addressed a circular letter (No. 659) to authorities administering the Sale of Food and Drugs Acts, stating that the attention of the Minister has been drawn to the presence of considerable quantities of arsenic on the surface of certain imported apples. The circular continues:—

> Two cases of arsenical poisoning have been traced to the consumption of imported Jonathan apples, and a number of samples of these apples which have been examined have shown various amounts of arsenic ranging up to one-tenth of a grain per pound. The contamination of apples by arsenic has been occasionally reported for a number of years, but the quantities of arsenic found by analysis on former occasions have generally been insignificant, and until recently no cases of illness have been traced to the consumption of such apples. The amount of arsenic is liable to be especially large in apples grown in dry foreign climates where the apples are repeatedly sprayed during growth and the rainfall is not sufficient to wash off the deposit.

The Minister adds that importers of apples from the regions concerned are taking such steps as are possible to secure the removal of the contamination from future consignments, but he urges upon local authorities the necessity, especially during the next few weeks, of making full use of their powers under the Sale of Food and Drugs Acts, the Public Health Acts, and the Public Health (Imported Food) Regulations to protect the public by the examination of samples of apples likely to be affected and by arranging for the withdrawal from sale of apples which are found to be dangerously contaminated.

SEXUAL OFFENCES AGAINST YOUNG PERSONS.

THE Departmental Committee appointed by the Home Secretary in July, 1924, to collect information as to the prevalence of sexual offences against young persons and to report upon any direction in which the law or its administration might be improved, has issued a report[2] which deserves close study. The Committee's 43 recommendations, which we print in another column, range over a wide area. Detailed discussion of them is impossible within brief compass, but we may at least draw attention to certain points of direct interest to the medical profession in Section 6 of the report (Matters Relating to the Offender), from which arise Recommendations 27 to 32. The Committee was pressed by not a few witnesses to advocate mental examination of all sexual offenders. There was, however, ample evidence of the great variety of the types of offenders, and, notwithstanding a common popular view to the contrary, there was no conclusive proof that most of such offenders are insane or mentally defective. The Committee took 200 examples of men certified in prisons as mentally deficient, and found that 50 of them were undergoing imprisonment for sexual offences. Conversely 108 examples were taken of men remanded to prison for indecent assault, incest, and carnal knowledge (the offences in all these cases being against young persons under 16), and none were found who could be certified as insane, while only 8 were certifiable as mentally defective. But there is one form of offence—namely, indecent exposure of the person—in which the proportion of mental instability is demonstrably high. Thus of 150 men remanded to prison for this particular offence 14 were found to be insane and 24 were certifiable as mentally deficient. Impressed by this comparatively large proportion, the Committee recommends that all persons convicted of indecent exposure should undergo mental examination. Further evidence failed to prove that sexual offences against the young are committed, as a rule, by habitual offenders, except in the case of indecent exposure, and except, to a lesser extent, in the case of indecent assault. In one large town, the report states, out of 77 men accused of sexual offences against persons under 16, only 5 had been previously convicted on similar charges. The Committee suggests that in this minority of cases of repeated offences, and also in any case where mental disease or defect is suspected, the offender's mental condition should be examined as already proposed in cases of indecent exposure. It recommends that the mental examination should be made by a mental expert upon a remand after conviction, and that the bench should act in accordance with the result of the examination. Only a few county or borough courts at present have the advantage of the services of a mental expert. It usually happens that the court has to rely upon the help of the local police surgeon or prison doctor who—although in most cases his assistance has been conspicuously valuable—has not always specialised in mental work so as to be an expert in mental disease. The Committee recommends that, when courts are not in a position to have the full-time services of a mental expert, arrangements should be made, without setting up new machinery or multiplying personnel, for the medical superintendent of the county or the borough mental hospital, or for the medical officer of the Mental Deficiency Act Committee, to serve as mental expert to the courts in the district. Another useful recommendation is one which THE LANCET supported some months ago,[3] when it was advocated in the report of the Prison Commissioners. It is that the Mental Deficiency Act should be amended by the elimination of the words "from birth or an early age." These words are an obstacle to proper certification. A case was mentioned in which a man had 50 convictions for indecent exposure, and was said by the local authorities to be a moral imbecile of hopeless character addicted to annoying school-children. Yet, because the doctors could not trace evidence of his mental history at an earlier age than 25, they could not certify him, although they knew him to be now and for many years past a proper subject for certification.

In general the Committee deprecates punishment of sexual offenders by way of fine; it considers probation sometimes suitable when fine is not; it declines to express an opinion on the time-worn but still vigorous controversy of whipping as a deterrent, and it concludes that imprisonment is the most suitable penalty in the majority of cases. It comments sharply upon the inadequacy of some sentences upon sexual offenders as contrasted with far heavier sentences awarded for offences against property. Where, as the result of mental examination by an expert, an offender is found to be insane or mentally defective, treatment will, of course, follow the usual lines. If there is no mental disorder, but there are repeated offences by the same person, the Committee recommends a policy of long periods of detention in special institutions. The problem of the elderly offender, whose acts are due to special physiological or psychological cause, is recognised. The Committee suggests that if the offence is an isolated one he can be placed on probation under supervision; if there

[1] See THE LANCET, 1925, ii., 1295.

[2] Report of the Departmental Committee on Sexual Offences against Young Persons. [Cmd. 2561.] London: H.M. Stationery Office. 2s.

[3] THE LANCET, 1925, i., 498.

are repeated offences, he should be confined in some non-penal institution.

Other points of professional interest in the report deserve mention. It is suggested that the services of women doctors be freely employed in the medical examination of young girls who are alleged to have been the victims of an offence. It is said that experience shows that where a girl has to be examined after complaint to the police there is less likelihood of causing her further mental disturbance if the examination is made by a woman doctor. As to the medical examination of an accused man the Committee moves cautiously. If the charge suggests the communication of venereal disease to the child, medical examination might enable an innocent man to clear himself; on the other hand, the medical examination may disclose evidence of disease which would corroborate the charge. The Committee rightly gives considerable attention to provisions for child welfare and to possible preventive measures, such as better housing, less overcrowding, more supervision in parks, cinemas, and school precincts, and the training of student teachers with a view to their giving sex instruction to the older children. Perhaps the most important, as well as the most controversial, recommendation is the proposal to raise the age of consent to 17, though on this point there is weightily reasoned dissent on the part of the legal members of the Committee—Mr. J. C. Priestley, K.C. (who replaced the late Sir Ryland Adkins as chairman); Mr. T. W. Fry, the metropolitan police-court magistrate, and Sir Guy Stephenson, Assistant Director of Public Prosecutions. On the whole the unanimity of the report is striking. It is not easy to reconcile conflicting opinions on vexed topics like these. On the one side are the reformers, supported by a large and sympathetic body of voters throughout the country, and keenly sensible of the harm which sexual offences inflict upon the child victim. The reformers complain that there are too few prosecutions and too many acquittals; they want to give more jurisdiction to petty sessions, because juries at quarter sessions and assizes bring in so many verdicts of "Not Guilty"; they press for heavier punishments, a less rigid insistence on corroboration and strict legal proof, the abolition of all technical defences (such as that of "reasonable belief" that the girl was over the prohibited age), and a considerable raising of the age of consent. On the other side are the lawyers, and the judges recruited from the ranks of the lawyers, who insist that nothing must impair the traditions of law and procedure which are properly framed to ensure a fair and impartial trial. There is also what might be described as the Home Office view, sensible of the stronger arguments of both these parties and withal aware that it is undesirable to create innumerable fresh crimes, idle to enact severe punishments which courts will flinch from inflicting, and unsatisfactory to move too far in advance of a slowly instructed public opinion.

THE HUMAN CONSTITUTION.

THERE has been for some years past an increasing tendency to direct attention towards what, for want of a more fitting term, is referred to as the human "constitution." The word has a familiar sound for the elders amongst us, and no doubt brings back to their minds memories of the great clinical physicians and surgeons whom they followed years ago. The acumen of these men, the way in which they would put an unerring finger on a patient's weak spots, seemed at times uncanny. Perhaps they would have found it hard sometimes to explain their grounds for an opinion, right though it proved to be, very much as we might find it almost impossible to say why we recognise with certainty someone whose face we cannot see, and whose garments are not those he wore when we last met him. Clinical instinct and insight retired modestly into the background when the laboratories and the researcher claimed the whole of medicine as their sole province; but it is again becoming evident that the human body cannot be explained in the laboratory or the dead-house. The subtle differences that make or mar an individual are none the less real because they are intangible, and herein lies the necessity for recognising the "constitution" of the individual. But this term has not quite the same meaning as it used to have; the modern conception is synthetic, it builds itself on measured data, and it cannot yet afford to stand away from a man and take a wide view of him. The fourth Henderson Trust Lecture,[1] delivered by Prof. W. W. Graves at the University of Edinburgh last October, is an admirable example of the material on which this new study of the individual man can be based. Prof Graves introduces us here to points about the scapula which will be new to many, if not to most, of us; he shows the hereditary nature of types, their persistence, and their indicatory significance with regard to morbidity and adaptability in general. As he has dealt with some 30,000 subjects, living and dead, his results may be considered fairly definite. Perusal of this interesting and important lecture makes one hope that in the not far distant future some use may be found for those portentous indices which sadden the reader of so many works on physical anthropology, and, if these can be made to show a value like that given to scapular types here, their accumulation, from the point of view of medicine, would be justifiable. The lecture should be read by clinicians; it cannot be much more than a rapid survey, within the limits of time of a lecture, but a full bibliographical index gives the reader the means to extend his acquaintance with the subject.

Modern Technique in Treatment.

A Series of Special Articles, contributed by invitation, on the Treatment of Medical and Surgical Conditions.

CLIV.—THE TREATMENT OF CHRONIC MASTITIS.

THE treatment of "chronic mastitis" has in the past been somewhat obscured by misunderstanding of its ætiology. It cannot be claimed that this is even now fully understood, but it is at any rate clear that the ætiology implied by the name which has so long been given to the condition is not the true one; consequently treatment aiming at allaying chronic mastitis on the supposition that it is an ordinary inflammation of the breast, due to a subacute infection with a pyogenic organism, such as a staphylococcus, is doomed to failure.

Sir Lenthal Cheatle has on many occasions stressed the necessity for a reform in the terminology of the chronic lesions to which the breast is subject, and has suggested the term "mazoplasia" instead of "chronic mastitis," on the ground that the epithelial changes so constantly found are the essential feature of the condition. Epithelial changes are, however, only one incident in a pathological complex which it is almost impossible to summarise in a single word, and it may be wiser to postpone for the present any attempt to oust a term the use of which has become ingrained by the custom of so many years.

Chronic mastitis is not a disease of one age or sex, but is found in both sexes and, in its different forms, at all times of life. Its incidence is dependent, not on a bacterial infection, but rather on a disorderly process of secretion and absorption which are going on at all times in varying degree in a gland unprovided with an outlet except during lactation. The pathological and statistical evidence for these statements

[1] The Relation of Shoulder Blade Types to Problems of Mental and Physical Adaptability. By Prof. William Washington Graves, St. Louis, Mo., U.S.A. London and Edinburgh: Oliver and Boyd. 1925. Pp. 35. 6d.

has been elaborated by me elsewhere.[1] In the present article no more reference will be made to ætiology than is necessary in order to indicate a rational basis for the treatment recommended.

The mammary gland is provided with epithelium which is possessed of some secretory activity at all times of life. Its physiology is therefore intimately bound up with its pathology, and for present purposes its physiological history will provide some sort of arbitrary basis for indicating the lines upon which the pathological manifestations may be treated. The names used must be regarded as a matter of convenience rather than as representing the whole truth.

Infantile Mastitis.

It may often be noticed that the breasts in a newborn child are enlarged and tender. It may even be possible to express from them a certain amount of secretion, and midwives have advised a systematic removal of this fluid. The activity of the breasts is probably due to the exposure of the infant before birth to the same hormonic stimulus which, in the maternal circulation, is tending to produce normal lactation. Interference with the breasts of the infant in this state results sometimes in infection, followed by an acute suppurative mastitis. If the breasts are left undisturbed, the congestion and enlargement will soon subside of its own accord. No treatment, therefore, is called for except, perhaps, the application of a sedative lotion, such as lotio plumbi cum opio, to allay any pain which the infant may be suffering.

Puberal Mastitis.

Between the ages of infancy and the onset of sexual maturity the breasts are very unlikely to show any signs of activity, and attention will not be directed to them. It is common, however, for girls of about 12 years and for boys a year or two later to complain of a painful enlargement of the breasts for which their parents seek medical advice. Histological examination of breasts in this condition shows that the large collecting ducts are filled with a clear fluid secretion, but that there are no truly pathological changes in the epithelium or elsewhere. The pain is not severe, and can be endured. The patient and the parent can be reassured as to the harmlessness of the condition. In girls it will merge with the normal hypertrophy of sexual maturity; in boys it will persist for two or three years or even longer, and will eventually disappear. Seldom is any active treatment called for. Surgical treatment of the mammary gland in boys or young men will only be necessary in the rare cases in which the congestion of puberty has passed into the true hypertrophy called gynæcomastia. The gland can then be dissected out from beneath the nipple and areola, so that there need be no visible mutilation.

Menstrual Mastitis.

From the onset of puberty in girls the activity of the mammary glands is closely associated with that of the ovaries, as indicated by the menstrual periods. In this connexion it is not uncommon to meet with women in the third decade of life in whom the usual clinical signs are absent or only slightly marked, but who complain notwithstanding of discomfort or pain in the breasts, this being greatly accentuated during, or just before, the menstrual periods. The treatment of such cases is usually difficult and unsatisfactory. Palliative treatment may be given, such as an application of glycerine and belladonna and the administration of potassium iodide. The breasts, if large, may be supported in the way recommended by Mr. Duncan Fitzwilliams, that is by the application of two vertical strips of adhesive strapping which start below the breast, pass over it on either side of the areola, and extend over the top of the shoulder. These measures may give some relief of pain, but usually it subsides only with the decline of the menstrual period. Sometimes the psychological condition of the patient is abnormal and the breasts receive a disproportionate amount of her attention, so that the treatment should be subjective rather than objective. If circumstances allow, marriage followed by pregnancy and lactation will prove to be the best solution of the difficulty. Operation should be avoided.

Chronic Mastitis.

After the age of 30 the incidence of true "chronic mastitis" rises rapidly, and with it the proportion of cases in which the usual local signs of the disease become more obvious. At the same time the association with menstruation becomes less marked. At this stage the palpably dilated ducts and acini contain increased secretion, and an attempt should be made to remove it. Sometimes this may be effected by opening up the mouths of the ducts in the nipple by bathing with warm water and then applying a suction bell. This should be done systematically once a day, and a considerable quantity of turbid or greenish fluid may be removed in this way, and relief obtained. But, owing to occlusion of the ducts by fibrosis, the process may not be successful, so that the parts of the breast most affected may not be effectively drained, and the treatment should then not be persisted in for long. At the same time careful attention should be given to proper regulation of the bowels, and other possible sources of chronic intoxication, such as infected nasal sinuses, infected teeth, or cervicitis, must be sought for and treated. Any of these may interfere with the normal reabsorption of the secretion in a non-lactating breast, with consequent initiation or accentuation of pathological changes therein.

If none of these methods of treatment are effective, the use of X rays must be considered. The object of X ray treatment is the production of an artificial atrophy of the glandular epithelium with consequent inhibition of all secretory activity. The dosage required must be accurately gauged; usually one application by an expert radiologist results, after a temporary increase of pain, in considerable relief of symptoms. Sometimes a second application may be needed after an interval. This treatment must not be given if the patient is likely to become pregnant at a later date.

Chronic mastitis in its later stages is very often associated with the presence of cysts and with more than one form of epithelial overgrowth. A single small cyst may occasionally be satisfactorily treated by aspiration of its contents, but this is purely palliative. The cyst will probably recur, and it is nearly always the sign of diffuse, but less obvious, changes in the rest of the breast. If the cyst is large, or if several are present, operative treatment will have to be considered, since the application of X rays is not to be advised. It is a matter of experience that chronic cystic mastitis is less often associated with the presence of carcinoma than chronic mastitis without cysts, so that operation need not necessarily be regarded as imperative. Removal of one segment of a breast, or even local excision of a cyst, may occasionally be justified, but complete local amputation of the breast is usually to be preferred. The differential diagnosis between a localised chronic mastitis and an early carcinoma may be extremely difficult to make on clinical evidence alone, and if the slightest suspicion of the presence of a carcinoma has arisen, then an operation must be performed without delay. At the same time it may be remembered that chronic mastitis is not a "precancerous" condition in the great majority of patients in whom it occurs, so that the importance of operation on this theoretical ground need not loom too largely in the mind of the practitioner. No rules, however, can be laid down for guidance, for every case must be carefully considered on its merits.

GEOFFREY KEYNES, M.A., M.D. Camb., F.R.C.S. Eng.,
First Assistant, Surgical Professorial Unit, St. Bartholomew's Hospital.

[1] Brit. Jour. Surg., 1923, xi., 89.

Special Articles.

INTRODUCTION TO A DISCUSSION ON FRACTURES IN THE NEIGHBOURHOOD OF THE ANKLE-JOINT.*

BY HARRY PLATT, M.D. MANCH., M.S. LOND., F.R.C.S. ENG.,

SENIOR HON. SURGEON, ANCOATS HOSPITAL, MANCHESTER; CONSULTING ORTHOPÆDIC SURGEON, LANCASHIRE COUNTY EDUCATION AND PUBLIC HEALTH COMMITTEE.

A LITTLE more than 100 years ago Guillaume Dupuytren (1777–1835), then the foremost surgeon in France, writing on fractures of the lower end of the fibula, made one of his most illuminating contributions to the literature of our art.[1] From this essay, which represented the experience of a 15-year period as surgeon-in-chief to the Hôtel-Dieu in Paris, dates the real foundation of our present knowledge of the anatomy and the mechanism of production of ankle-joint fractures. Although injuries of this type must have been familiar problems in the practice of both of the ancients and of the surgeons of the Middle Ages, as Dupuytren himself pointed out, from the writings of Hippocrates, Ambroise Paré, and other great masters, scanty information is to be gleaned. But in the eighteenth century J. L. Petit (1674–1750), our own Percival Pott (1713–1788), and Cl. Pouteau (1725–1775)—all names to conjure with in the evolution of the surgery of fractures—began to teach that injuries which had long been classed as *dislocations* of the ankle-joint were always accompanied by fractures of one or both bones of the leg. This conception was adopted wholeheartedly by Dupuytren, and is emphasised in his recognition of the fibular fracture as the pivotal injury, with the dislocation as a consecutive phenomenon. It is interesting to compare his writings with those of another great surgeon of that generation—Astley Cooper—who has also left behind a masterly exposition of this subject, with the injuries described as primary dislocations, but from which the student of to-day can reconstruct every known variety of ankle-joint fracture.[2] In the introductory part of Dupuytren's memoir the serious disabling consequences of ankle-joint fractures are stressed in phraseology which leaves us in no doubt as to the type of functional result regarded as inevitable at that date. He writes as follows: "Under the most favourable circumstances they (i.e., fractures of the lower end of the fibula) almost always leave deformity and lameness, which renders progression more or less difficult or painful." (I quote from the admirable translation of Dupuytren's clinical lectures made for the Sydenham Society in 1846 by a bygone surgeon of St. Thomas's Hospital—Le Gros Clark.[3]) But Dupuytren saw no reason to rest content with contemporary standards of fracture treatment, and some idea may be gained of the therapeutic triumphs he achieved when we learn that in a personal series of 207 ankle-joint fractures 202 were "cured," and of these in *two* only was there deformity, and in *one* only loss of mobility! For an explanation of the five deaths in this series we must visualise the terrors of the compound fracture before the advent of the Listerian revolution.

Such quotations hold more than a purely historical interest for us. Is Dupuytren's graphic description of the sequelæ of ankle-joint fractures a mere echo from the past, or does it recall a type of disability with which we are still familiar? And to-day a full century since Dupuytren taught and perfected efficient methods of treatment, do his standards still prevail in the general handling of ankle-joint fractures? I think the answer is contained in the deliberate choice of the subject for discussion at this meeting. It is thus an old chapter in the history of surgery which we are about to reopen, and though our subject is a commonplace problem in surgical handicraft, classical in its antiquity, it appears strangely new as each succeeding generation comes fresh to its difficulties, often oblivious of the wealth of knowledge already bequeathed by the older masters.

Classification of Ankle Fractures.

Ankle-joint fractures fall naturally into two distinct groups which have really little in common. In the *first* and more important group are the *fractures of the leg bones*—lower end of the tibia and fibula; the *second* comprise fractures of the *astragalus*. As a rough indication of the relative incidence of the two groups of lesions, I might quote some personal statistics. In the four-year period, 1921–24, in which I have reviewed for the purpose of this paper the *recent* ankle-joint fractures treated in my own clinic, there have been 116 fractures of the leg bones and four fractures only of the astragalus. In the first nine months of this year (1925—January to September), 29 recent ankle-joint fractures have passed through my unit at the Ancoats Hospital, but all belong exclusively to the first group. Fractures of the astragalus are thus comparatively rare injuries. They have a certain intrinsic interest, but from an ætiological and mechanical point of view would be more appropriately studied with fractures of the os calcis. We shall now consider the two groups separately, devoting the greater part of our attention to the fractures of the leg bones.

Fractures of the Leg Bones (Tibia and Fibula).

Nomenclature and Classification.—Much confusion surrounds the current nomenclature of ankle fractures, for at least three different types of terminology are commonly employed. In the first place, there is the *historical* classification, in which the name of some great surgeon of the past has become attached to a particular type, or group, of fractures—e.g., Pott's fracture, Dupuytren's fracture. Then there is the classification based on the *mechanism of production*, as illustrated in the use of such terms as abduction fracture, adduction fracture; and, lastly, many attempts have been made to evolve a grouping with a strictly *anatomical* or *physiological* foundation—e.g., bi-malleolar fractures, isolated fractures of the fibula, and so on. It is desirable in the interests of surgical teaching that the scope of such varied terminology should be defined and, if possible, some simple standardised classification adopted for general use.

1. *Historical Nomenclature.*—It is often stated that Pott obtained first-hand knowledge of the fracture with which his name has become inseparably associated as a result of a personal accident. But this is untrue, for the injury sustained by Pott was a fracture of the shaft of the tibia—probably with little or no displacement, and from which he made an excellent recovery.

In the course of a general essay on fractures of the leg bones and their treatment, a description of what Pott believed to be the common ankle-joint fracture was given, accompanied by an illustration which is now classical[4] (Fig. 1). It will be seen that this injury consisted in a *transverse* fracture of the fibula about 2½ inches above the malleolar tip, combined with a rupture of the internal lateral ligament and a conspicuous outward displacement of the foot. Pott gave a logical account of the mechanism of the eversion deformity, which in his view was due to the mechanical advantage obtained by the peronei muscles as soon as the support of the fibular strut was lost. It is also clear from his writings that he had treated such injuries with success, reducing the deformity after flexing the knee and placing the limb on its outer side. Dupuytren (loc. cit.), writing 50 years later, whilst applauding Pott's description,

* The discussion took place at the annual meeting of the British Orthopædic Association, Manchester, on Oct. 23rd, 1925. In a forthcoming issue of THE LANCET will be given further contributions to the discussion. The illustrations to Mr. Platt's paper, with one exception, are the work of Dr. Margaret Greg, of Manchester, and for the most part are accurate line drawings of radiograms.

expressed the opinion that the English surgeon did not employ appropriate retentive treatment.

It is now evident that as a description of the common ankle-joint fracture Pott's account and illustration contain several anatomical inaccuracies. Indeed Ashhurst, of Philadelphia,[5] who has given us the most authoritative essay on ankle-joint fractures of modern times (1922), declares that Pott depicted a type of fracture which does not exist! Dupuytren appeared, however, to accept Pott's description as a sufficiently faithful picture of the common fracture of the lower end of the fibula accompanied by displacement of the foot, an injury which dominated his own series of 207 ankle fractures. To this familiar lesion the French have given the name Dupuytren's fracture. Unfortunately in English surgical literature the term Dupuytren's fracture is applied to a fracture of the fibula with complete diastasis at the inferior tibio-fibular junction, and gross displacement of the astragalus which follows the distal fibular fragment and comes to lie in contact with the lateral aspect of the tibia. This is an exceedingly rare lesion, which Dupuytren himself saw *once* only in a series spread over a period of 15 years. We should therefore agree to eliminate the Dupuytren fracture of the English text-books as a term denoting a definite *group* of lesions (see Fig. 8). According to Ashhurst, the first accurate description of the typical ankle fracture recognised clinically both by Pott and Dupuytren is to be attributed to Maisonneuve[6] (1840), who established the great frequency of the *oblique* fracture of the lower end of the fibula and its production by pure *external rotation* of the foot on the leg.

It is obvious that it will be difficult, if not impossible, to abolish the term "Pott's" fracture, in this country at least. It would therefore seem best to adopt some broad definition of its scope. There is little objection to its employment as a generic title, to include those fractures of the lower 3 inches of the fibula, which are accompanied by rupture of the internal lateral ligament or fracture of the internal malleolus, and in which there is the slightest degree of deformity at the ankle-joint—either eversion alone or eversion combined with posterior displacement of the foot. But at the same time it would be more generous, and historically more accurate, to speak of fractures of the *Potti-Dupuytren* type. This is the terminology which will be adopted in this paper.

FIG. 1.

Copy of Pott's original illustration.

2. *Mechanism of Production.*—The mechanism of the production of ankle fractures must receive our close attention quite irrespective of any attempt to establish a working classification. The older surgeons first approached this problem from the experimental standpoint in the production of ankle fractures on the cadaver, notable contributions being made by Maisonneuve (1840), and, later, Tillaux[7] (1872), and Hönigschmied[8] (1877).

Ankle-joint Mortise.—The physiological mechanics of the mortise formed by the lower ends of the tibia and fibula should need little elaboration. Certain points, however, may be emphasised. (1) Although the two bones are bound together by the strong ligaments of the inferior tibio-fibular junction, the mortise exhibits an appreciable degree of elasticity which is called into play as the astragalus is thrust back during dorsiflexion of the foot. (2) The stout connexion maintained between the fibula and the astragalus by the posterior fibres of the external lateral ligament of the ankle has no counterpart on the mesial aspect of the joint. In consequence, in all injuries in which the tibio-fibular continuity is lost, the astragalus remains attached to the fibula and is displaced with it (Fig. 2). (3) Backward displacement of the foot cannot occur until the fibula is freed entirely from the tibia, or alternatively the astragalus is freed from the external malleolus. The latter contingency does not arise in ankle-joint fractures.

FIG. 2.

Right ankle-joint (posterior view). Shows the strong fasciculus of the external lateral ligament which binds the external malleolus and astragalus together.

Types of Violence.—A study of the mechanism of production of ankle fractures resolves itself mainly into a consideration of the effects of the different types of *indirect violence*, for fractures in this region due to direct violence are extremely rare and possess little special interest (1 per cent., Ashhurst). There are three types of forced movement of the foot in which a breaking strain may be transmitted via the astragalus to the lower ends of the tibia and fibula. These are; (1) external rotation; (2) abduction (eversion); (3) adduction (inversion). To these may be added a fourth type of violence which often acts as a contributory factor—viz., an upward compression thrust on the ankle mortise.

1. *External rotation* as a form of indirect violence, in contradistinction to abduction, was first investigated by Maisonneuve, who from his experiments on the cadaver believed it to be the means whereby the common type of ankle-joint fracture was produced. In this movement the foot is rotated out in the ankle mortise around the vertical axis of the leg, and the force transmitted to the fibula is a *torsion* strain which breaks this bone in an *oblique or spiral fashion*, the line of fracture running downwards and forwards through the inferior tibio-fibular joint (Fig. 3). The ligamentous bond between the tibia and fibula for the greater part remains intact, so that in this fracture *diastasis* is rare. The fibular fracture is the pivotal injury and at this stage the violence may be completely expended. (The so-called fracture of the first degree.) But when the external rotation force continues to act certain consecutive lesions are induced—either a fracture of the internal malleolus, or its equivalent, rupture of the internal lateral ligament. (Fracture of the second degree (Fig. 4).) In a few extreme cases the tibial lesion is represented by a fracture which involves the whole width of its lower end. (The third degree fracture (Fig. 5).)

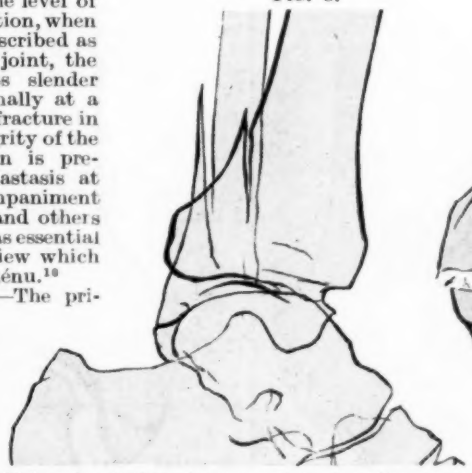
2. *Abduction* (eversion).—Force abduction of the foot tends to evert the astragalus in the ankle mortise, and so exercises a *bending* force on the lower end of the fibula. If the fibula breaks, the lesion shows all the characteristics of a bending or flexion fracture—i.e., the line is roughly transverse, and on the concave aspect there may be a localised comminution with partial detachment of a small wedge. Here, again, the

same forced movement tears off the inner malleolus. I have put the fibular fracture first, but chronologically the *internal malleolus* gives way before the fibula breaks. Three degrees of fracture again may be distinguished as in the external rotation fractures. In the torsion fracture produced by external rotation the site of the lesion is remarkably constant. But the abduction fracture may occur either (*a*) below the level of the inferior tibio-fibular junction, when the fracture is accurately described as *malleolar*, or (*b*) above this joint, the fibula breaking through its slender "surgical" neck, or occasionally at a still higher level. With a fracture in the former situation the integrity of the inferior tibio-fibular junction is preserved, but in the latter diastasis at this joint is the usual accompaniment (Fig. 6). Destot,[9] Ashhurst and others regard preliminary diastasis as essential in this type of fracture, a view which has been controverted by Quénu.[10]

3. *Adduction* (inversion).—The primary lesion induced by a forced adduction (tibial flexion) is the tearing off of the *external* malleolus. The continued compression thrust of the astragalus against the internal malleolus adds on a secondary fracture. But as Dupuytren showed, the associated tibial injury may be produced in a different way—viz., by weight-bearing immediately following the occurrence of the fibular fracture. In such cases the line of split may begin well within the mortise and emerge on the mesial aspect of the tibial shaft just above the ankle.

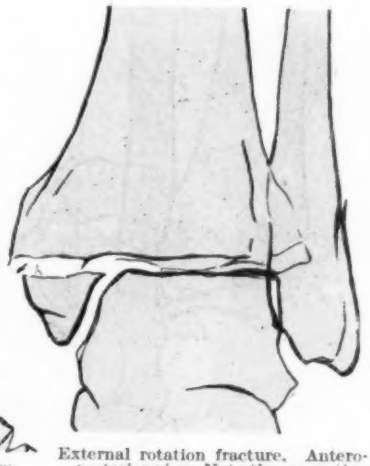
The relative incidence of the three forms of indirect violence has long been a matter for investigation and conjecture. Dupuytren surmised that 60 per cent. of his ankle fractures were produced by an *adduction* force, but he commented on the difficulties of obtaining accurate information from patients. This question has received greater elucidation since the introduction of radiography. Ashhurst, in an analysis of 300 cases, found *external rotation* fractures in 61 per cent., *abduction* fractures in 21 per cent., and *adduction* fractures in 13 per cent. His conclusions have been deduced from a careful scrutiny of the radiograms of his series which showed a preponderance of the oblique or spiral fracture of the fibula. In my own smaller series of recent ankle-joint fractures (116 cases) much the same relative incidence is seen. One finds, however, with Ashhurst, that the radiographic interpretation of a certain proportion of fibular fractures is difficult; and it is a matter of personal opinion whether these should be assigned to the external rotation or abduction class.

FIG. 3.



External rotation fracture. Lateral radiogram. Shows the oblique fracture of the fibula and a posterior marginal fracture of the tibia.

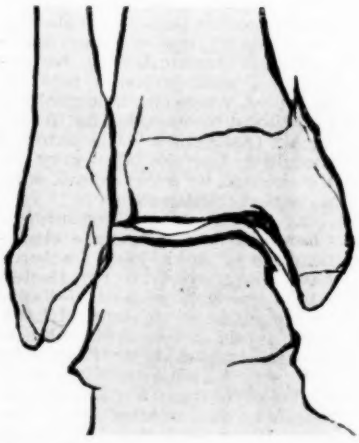
FIG. 4.



External rotation fracture. Antero-posterior view. Note the separation of the internal malleolus. The fibular fracture is scarcely visible.

4. *Compression Violence.*—In the mechanism of ankle fractures the rôle of another important factor remains to be considered—i.e., the effect of weight borne on the injured limb immediately following the solution of continuity of the fibula. An illustration of the intervention of this factor has already been quoted in connexion with the adduction group. The effect of body-weight is first of all to disentangle

FIG. 5.

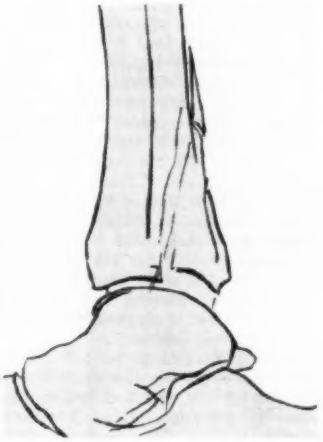


External rotation fracture (third degree) (after reduction). The tibial fracture includes the whole width of the lower end.

FIG. 6.

Abduction fracture. The fibular fracture of the "bending" type is unusually high. There is an accompanying diastasis.

FIG. 7.



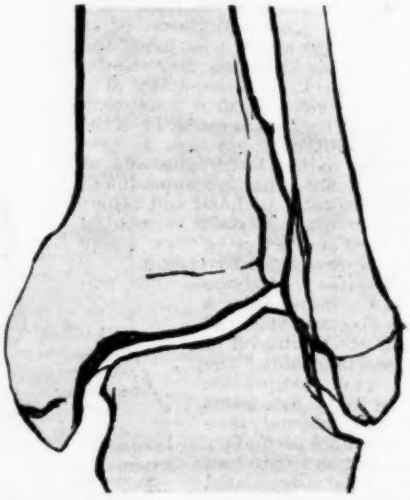
External rotation fracture. Shows accompanying posterior marginal fracture of the tibia.

the fibular fracture more completely, and so produce or enhance the eversion displacement of the foot. But in a certain proportion of ankle fractures this upward compression force is responsible for the production of a third fracture known both to Dupuytren and Astley Cooper, later forgotten, and rediscovered by many subsequent observers. This lesion are interdependent. This is well illustrated in skiagrams of many mal-united ankle-joint fractures (Fig. 9). An interesting example of backward displacement of the foot in an isolated fibular fracture, uncombined with a posterior marginal fracture or diastasis, has been recorded recently by Clavelin,[15] but in this case the fracture was produced by direct violence. There remains yet another consecutive fracture which on rare occasions may contribute to the anatomical picture of the typical ankle fracture. We have already referred to the occurrence of diastasis between the tibia and fibula in a certain proportion of abduction fractures. Usually this separation between the bones implies a pure rupture of the interosseous ligaments, but more rarely an *anterior marginal fragment* is detached from the tibia including what is known as the anterior tubercle. Diastasis by fracture may in exceptional circumstances be associated with external rotation fractures, where chronologically it is believed to precede the fibular break (Ashhurst). The anterior marginal fracture also may be represented by a mere crack with no actual displacement.

FIG. 8, A.

Combined fracture of both bones with extreme backward and outward dislocation. Note that the fibula remains attached to the astragalus, and the presence of a posterior marginal fracture of the tibia.

FIG. 8, B.



The same ankle six months after manipulative reduction, 1921. Antero-posterior view.

is now often called the *posterior marginal fracture* of the tibia. This fracture involves the separation of a triangular fragment from the posterior aspect of the tibia in the neighbourhood of the inferior tibio-fibular junction, the line of fracture running down into the roof of the mortise. The fragment remains indissolubly attached to the external malleolus, and is displaced with it in company with the astragalus (Figs. 7 and 8, A). Much attention has been paid to the incidence and the mechanical significance of the posterior marginal fracture, particularly by modern French writers—e.g., Chaput,[11] Destot (loc. cit.), Quénu (loc. cit.). Lucas-Championnière[12] was first responsible for the suggestion that it is produced by a crushing force acting upwards. This important consecutive injury is by no means a rare complication of ankle fractures. Ashhurst discovered 58 examples in his series of 300 (19 per cent.), and other writers—e.g., Destot, Quénu, and Speed[13]—have found it in roughly 10 per cent. of their cases.

It is interesting to note that this fracture may occasionally be present as an isolated lesion unassociated with the classical fibular injury (Meissner,[14] Ashhurst). Ordinarily it is to be discovered in a high proportion of external rotation or abduction fractures of the fibula in which there is gross displacement of the astragalus (Potts-Dupuytren type). It is to be remembered, however, that this fracture is often visible in radiograms where displacement is practically non-existent (see Fig. 3). Although posterior dislocation of the foot may occur in the absence of a posterior marginal fracture—i.e., where tibio-fibular diastasis has occurred (see Figs. 10, A, 10, B)—for practical purposes the deformity and the

FIG. 8, C.

Lateral view of the same. This patient returned to full work as a brewer's drayman eight months from the time of the fracture, and has worked continuously without symptoms of discomfort for the past three years.

3. *Anatomical and Physiological Classifications.*—Elaborate classifications of ankle-joint fractures have been evolved by Destot (1911) on a physiological basis, by Quénu on an anatomical basis (1912), and a simpler combined scheme suggested by Tanton in 1916.[16] Ashhurst (loc. cit.), whilst advocating a classification founded on mechanism, also presents an anatomical grouping as illustrated by his own material. For practical purposes a very simple classification is desirable, such as the following which is based on Tanton's more elaborate scheme.

Fractures of the Malleoli.—(1) Isolated. (*a*) Fibula, (*b*) internal malleolus. (2) Combined. (*a*) Low bi-malleolar, (*b*) Pott-Dupuytren type.

Fractures of the Tibial "Pilon" † (i.e., weight-bearing articular portion). (1) Isolated. (*a*) Anterior

† This is a term suggested by Destot.

marginal, (*b*) posterior marginal, (*c*) "T"- or "Y"-shaped, (*d*) atypical fractures. (2) Associated (with malleolar fractures).

This classification is capable of expansion for statistical purposes, and at the same time is simple enough for the maintenance of routine records in the work of a fracture clinic. Some such broad grouping is also necessary for use in undergraduate or post-graduate teaching, which in my judgment should be founded on an exposition of the mechanism of production as a natural approach to the study of the principles which govern efficient treatment. For this purpose the classification of Ashhurst is invaluable.

Incidence of the Various Anatomical Types.—Now that we have chosen from the available terminology some sort of practical grouping for ankle-joint fractures, it is instructive to inquire into the relative incidence of the various anatomical types. Ashhurst's series and my own lend themselves readily to such a survey.

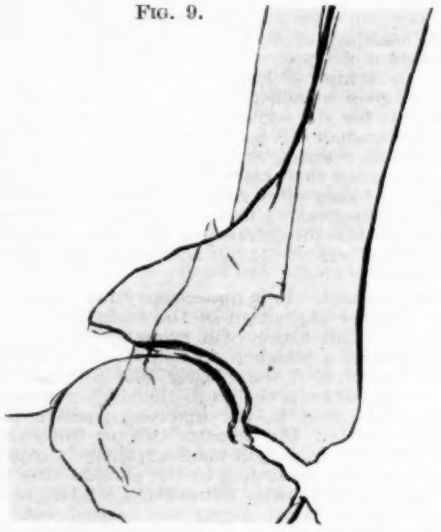
	Ashhurst.	Platt.*
Fractures of malleoli	300 cases.	116 cases.
	Per cent.	Per cent.
Isolated—Fibula	35	28
Int. malleolus	6	12
Combined—Low bi-malleolar	8 } 53	8 } 55
Pott-Dupuytren	45 }	47 }
Fracture of the tibial "plafond"—		
Isolated	2	3

* In this series the tibial fracture was represented by a so-called epiphyseal displacement in *three* cases.

Kellog Speed's (loc. cit.) series of ankle fractures reviewed in 1914 is more difficult to analyse on the above basis, as under the heading bi-malleolar he includes many lesions which we should assign to the Pott-Dupuytren class. His figures for the combined group of malleolar fractures, however, give a percentage which roughly corresponds to the incidence shown in the above table.

It is evident that in any consecutive series of ankle-joint fractures approximately 50 per cent. of the cases will be combined lesions of both bones.

FIG. 9.

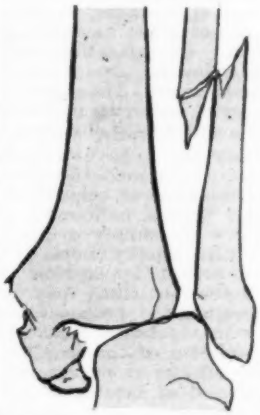


Malunited ankle fracture of six years' standing. The demarcation between the posterior marginal fracture and the remainder of the lower end of the tibia is still visible.

Moreover, it will be found that the predominating fracture of the fibula is the oblique or spiral type induced by external rotation.

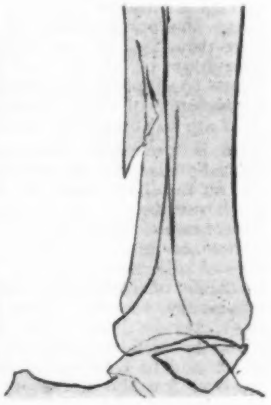
Incidence of Primary Deformity.—We must also realise that in the majority of ankle fractures there is no appreciable displacement of the astragalus. I make this statement with extreme diffidence, not unmindful of the finer degrees of mal-alignment of the fibula, internal malleolus, or astragalus, which radiograms often display (see Figs. 4, 7). In both Ashhurst's and my own series fractures with definite and unmistakable clinical displacement constitute at least *25 per cent. of the whole*, and the same conclusions may be derived from the figures of Speed and other writers. But I am convinced that a more careful scrutiny of the combined fractures of the tibia and fibula in the future will reveal a higher incidence of primary deformity.

FIG. 10, A.



Abduction fracture. Antero-posterior view. The fibular fracture is unusually high. Diastasis is present.

FIG. 10, B.



Lateral view of the same fracture. Note the backward displacement of the astragalus.

Clinical Considerations.

The conditions under which ankle fractures are produced, and the resulting clinical picture, are sufficiently familiar to render a detailed consideration unnecessary. Bearing in mind the high proportion of fractures in which obvious primary deformation is non-existent and crepitus not readily obtainable, we cannot insist too often on the necessity of a full radiographic examination of all ankle injuries in which the type of violence is a forced movement of the foot. Skiagrams in two planes are, of course, a sine qua non. The typical external rotation fracture of the fibula may be barely discernible in an antero-posterior view, but is always well shown in a lateral view (see Figs. 3 and 4).

In a patient seen for the first time a few hours after the accident, minor degrees of displacement may be masked to some extent by the effusion in or around the ankle-joint. In my opinion the vital importance of the early recognition of the lesser degrees of displacement is not widely appreciated. Such cases tend to become the victims of a laissez-faire attitude on the part of the medical attendant, be he junior hospital officer or general practitioner. A radiographic examination is often postponed for a few days, and the skiagrams when obtained are interpreted hastily as showing no gross displacement, so that there appears to be no indication for manipulative reduction under anæsthesia. Such limbs are occasionally laid on a pillow and early *passive* movements instituted—an example of the common modern abuse of the teachings of Lucas-Championnière.

The ankle fracture with gross eversion and backward dislocation of the foot, with the skin tightly stretched over the internal malleolus, offers little or no difficulty in diagnosis even to the uninitiated. Paradoxically enough such cases are often handled more effectively than those in which a minor displacement is present.

Treatment.

In the treatment of ankle fractures two distinct problems must be envisaged: (1) the treatment of recent fractures; (2) the treatment of old fractures giving rise to deformity and disability.

Recent Fractures.—At this stage in the introduction to our discussion the first great point for debate emerges. This is concerned with the relative merits of *conservative* and *operative* methods of treatment. It will be generally agreed that in the large group of fractures unaccompanied by appreciable displacement the employment of conservative measures as a routine is beyond criticism. Our attention must therefore be focused on the smaller group which shows the typical primary displacement. The economic importance of such injuries when occurring in adults who are in the prime of life is sufficiently obvious.

It is probably true to say—as I have already hinted—that the disabling sequelæ of ankle fractures are as familiar to-day as in the time of Dupuytren. Such results do not warrant a general indictment of conservative treatment. They are simply evidence either of gross neglect, which usually implies a missed diagnosis, or the imperfect application of methods of reduction and retention which may be inherently sound. The questions to be answered are: (1) Is it possible by manipulative measures alone to obtain accurate reduction of the displacement and to control the limb effectively by external fixation for the necessary period of healing of the fracture? And (2) in actual practice do such methods give the highest standard of functional results? If conservative measures are found wanting in any single particular, the arguments in favour of primary operative interference are likely to be overwhelming. It may be remarked here that the teaching of the Arbuthnot Lane school[17] has not met with ready acceptance, as far as ankle-joint fractures are concerned. I have made some attempt to answer these questions, and to define my own attitude in this discussion, chiefly as a result of a survey of the personal series of fractures already quoted, and also from the collateral experience over a longer period of a considerable number of similar fractures not systematically recorded.

When I began to take an intensive interest in this subject some three years ago, stimulated particularly by Ashhurst's unique paper, my general impression was that the routine use of non-operative methods was attended by far too many disappointments. At that time I felt tolerably certain that sooner or later I should be persuaded to give a systematic trial to reduction and fixation by open operation. This attitude was chiefly determined by the fact that the majority of the patients with recent ankle-joint fractures dealt with in my clinic were discharged from physiotherapeutic treatment somewhere between the eighth week and sixth month, according to the type of case.‡ At this stage most of them were considered fit to undertake light work. In many cases the records made at the time of discharge emphasised the existence of a slight limp, necessitating the use of a stick, and many ankle-joints which showed a satisfactory anatomical result were not entirely free from discomfort, and sometimes showed limitation of mobility. But my earlier impressions have been considerably modified by the information obtained from a survey of the late results, for it has been the rule to find that steady improvement has occurred from the sixth month onwards. I have been able to trace about 90 per cent. of the cases, and to estimate the type of functional result either from a personal examination or from the answers given in a questionnaire. The most striking results are seen in the patients reviewed after a period of two years or more has elapsed from the time of the injury, the great majority of whom have been able to return to pre-accident occupations involving laborious duties (see Fig. 8, A, B, C). No patient in this series is prevented from working as a result of his injury.

‡ The average period of full incapacity was 14 weeks.

I am confident that in the greater proportion (if not all) of ankle-joint fractures accompanied by displacement even of the most extreme degree, it is possible by non-operative methods to achieve perfect anatomical reposition, and to ensure the highest standard of functional result. Similar views have been emphasised recently by Ferry of the Strasbourg University Surgical Clinic.[18]

Of the 116 cases reviewed in my series, conservative methods have been employed in all but four, which were treated by open reduction between the fourth and sixth week following the injury. In two of these no previous attempt had been made to correct the primary displacement; in the remaining two manipulative reduction carried out in my own clinic, and for which I accepted responsibility, failed to give perfect readjustment. These operations do not really belong to the category of deliberate primary operative reduction, but they illustrate in my judgment the true rôle of operative methods in the treatment of recent ankle-joint fractures—i.e., that one should be prepared to resort to operation only if manipulative reduction—repeated if necessary—has failed, or where displacement has been left uncorrected for some days.

The Technique of Manipulative Reduction.

The method used in my own clinic has been correction of the displacement under full anæsthesia at the earliest possible moment, followed by the immediate application of a well-fitting plaster-of-Paris cast with the posterior part of the foot fully inverted. I believe that it is difficult to effect perfect readjustment in the majority of these fractures except under conditions of complete muscular relaxation; and further, in my experience, there is no form of retentive apparatus, other than plaster-of-Paris which gives adequate control of the heel once correction of the eversion and backward dislocation has been achieved. In hospital practice the primary reduction of a Pott-Dupuytren fracture must of necessity often fall to the lot of the surgical residents. It is only where there is a segregation of fractures that residents can hope to acquire dexterity and confidence in the handling of these injuries. In the fracture organisation of my own hospital, the resident surgical officer (a senior "long-stay" resident) and the house surgeon attached to my unit are conjointly responsible for the control of all fractures once they reach the casualty department. Many of the ankle fractures are reduced and are fixed in plaster before I see them. In such cases it is a strict rule that the radiograms taken after reduction must be submitted to me for approval. I find it necessary to emphasise unceasingly the importance of the minor degrees of displacement and the advantages of prompt reduction in all cases.

After-treatment.—It is unnecessary for me to enter into a detailed exposition of the technique of after-treatment. This aspect will probably be elaborated in the discussion which is to follow. It is my usual practice to bivalve the plaster cast at the end of three weeks, or even earlier in the slighter cases, but to retain the foot in the inverted position in the posterior half of the plaster two or three weeks longer. At this stage light massage, active movements of the toes, and, according to the surface area available, graduated faradic stimulation of the muscles of the anterior tibial group are carried out. The posterior half of the cast may with advantage be worn for some little time as a night splint. When the limb is left entirely free from restraint, more energetic physical methods are employed, but forced movements of the ankle-joint are, of course, prohibited. Where there is an unusual persistence of œdema or pain, radiant heat or diathermy are prescribed. Before weight-bearing is tried—from the tenth week onwards—the classical precautions to prevent secondary deformation are adopted—viz., the wedging up of the inner border of the shoe, and,

in patients of heavy build, the application of a short outside steel and "T"- strap. This is worn for some six months. The final stage in the physiotherapeutic régime is gymnasium treatment given in the "ankle class."

Old Fractures.—During the four-year period chosen for a review of my recent ankle fractures, a series of 50 old ankle fractures treated elsewhere, and presenting some form of disability, have passed through my hands. It is interesting to find that the majority of these showed malunion with well-marked deformity, which points to the conclusion that given a good anatomical reduction the functional result is rarely unsatisfactory.‖ This series contained, however, a few patients with painful ankle-joints showing a certain degree of limitation of mobility, but with no trace of mal-alignment. In a considerable number of the cases of gross malunion, there was free mobility at the ankle. The deformity generally appeared to have been determined by imperfect reduction, rather than neglect in after-treatment, although no doubt the latter factor played a contributory rôle.

In the treatment of the disabilities which may follow ankle fractures we are called upon to choose between mere *palliation* and the use of *operative measures.*

(*a*) *Palliative treatment* is often the only method available, by reason of age, physique, or the economic situation of the patient. In cases with deformity much comfort is derived from the wearing of the usual outside steel and "T"-strap; but this appliance must be a permanency. For the painful ankle-joint, which is most probably the seat of an early osteo-arthritis, we are compelled to rely on the usual analgesic physiotherapeutic measures which are only too often disappointing.

(*b*) *Operative Treatment.*—In younger individuals the advisability of operative reconstruction of the fracture should always be seriously considered. The choice of operation must be based on the pathological anatomy of the fracture in each individual case.

Several types of operation may be briefly reviewed. (*a*) For malposition in the intermediate stages before union is complete, or some months after the injury, correction should be obtained after cutting through the line of the fractures in both fibula and tibia. (*b*) In long-standing cases with a pure eversion deformity, a *linear osteotomy* of the fibula combined with *cuneiform* resection of the *tibia* allows accurate restoration of the axis of the astragalus. (*c*) In long-standing cases with gross backward displacement of the foot showing the posterior marginal fracture, in addition to an osteotomy of the tibia and fibula, the projecting tibial block should be freely excised (see Fig. 9). (*d*) In a certain proportion of old cases with extreme deformity and pain, the reconstructive operation will resolve itself into an *arthrodesis* of the ankle-joint.

The cosmetic and functional results of the reconstructive operations for old Pott-Dupuytren fractures are variable. After the correction of an eversion deformity in which free mobility of the ankle-joint is retained, the results are most gratifying. But where there is a bony block at the ankle, in my experience it is rare to be able to restore reasonable mobility. *Speaking generally, one finds that correction of deformity is followed by a relief from pain.* As in the recent fractures, adequate after-treatment is essential.

This brings to a conclusion our survey of the first group of ankle fractures, and before proceeding to introduce the second group I would suggest that in the discussion to follow extended debate is desirable on the following points: (1) The general standards of functional result obtained by conservative methods of treatment. (2) The rôle of operative interference in recent fractures. (3) The technical minutiæ of manipulative methods of reduction and retention. (4) Types of reconstructive operation applicable in the old fractures, and the general results obtained.

‖ See the ankle fractures reviewed by Ashhurst (Archives of Surgery, November, 1923, vii., No. 1).

Fractures of the Astragalus.

Owing to their comparatively low incidence in ankle-joint fractures as a whole, *fractures of the astragalus* do not lend themselves so readily to a broad presentation. It is well known that they occur either as *isolated lesions* or in *association* with injuries of other tarsal bones, and more particularly in combination with fractures of the os calcis. A simple anatomical grouping divides these injuries into (*a*) fractures of the body and (*b*) fractures of the neck. The mechanism of production is simple—viz., the upward compression thrust of a fall from a height on to the heel. The resulting disturbances may involve (1) the ankle-joint; (2) the astragalo-scaphoid joint, or (3) the subastragaloid joint. In the latter event the mechanical problems are those presented by the os calcis fractures, and therefore lie outside the scope of this discussion.

Treatment.—In the treatment of *recent* fractures of the astragalus it is impossible to lay down hard-and-fast rules. Each fracture must be considered on its merits. Conservative measures, in the earlier stages at least, are likely to prove effective. But where there is gross primary distortion of the astragalus, with the certainty of a future bony block at the ankle, operative interference must be contemplated.

Old fractures of the astragalus, giving rise to pain, deformity, and loss of mobility, are seen from time to time.

Such disabilities may be dealt with by appropriate operative treatment, which will generally include either the resection of a bony block (partial or total *astragalectomy*), or, in a few extreme cases, the surgical fixation of the painful and deformed joint (*arthrodesis*).

Conclusion.

The subject of ankle-joint fractures is now before the meeting, and the points which appeal to me as worthy of special consideration have already been emphasised. The success of the discussion which is to follow will be measured not merely in terms of the brilliant results achieved by a few individual surgeons, specially gifted or fortunately placed, but rather in the impetus it may give to a renewed effort to improve the general standard of the treatment of such injuries. We are undoubtedly on the eve of a renaissance in the organisation and treatment of fractures, a movement which especially concerns the members of this Association. Let us confidently hope that soon the century-old dictum of Dupuytren will lose its sting, so that in speaking of ankle-joint fractures it may never be said that "under the most favourable circumstances they almost always leave deformity and lameness, which renders progression difficult or painful."

References.

1. Dupuytren: Ann. Med.-chir. des Hôpitaux et Hospices Civiles de Paris, 1819.
2. Astley Cooper: Treatise on Dislocations and on the Fractures of Joints, London, 1822.
3. Sydenham Society: Injuries and Diseases of Bones—Dupuytren. Translated by D. le Gros Clark, London, 1847.
4. Pott: Remarks on Fractures, London, 1768.
5. Ashhurst: Archives of Surgery, January, 1922, vol. iv., No. 1.
6. Maisonneuve: Arch. gén. de Médecine, 1840, i., 165, 433.
7. Tillaux: Quoted by Gosselin, Bull. de l'Acad. de Med., Paris, 1872, i., 817.
8. Hönigischmied: Deutsch. Zeitsch. f. Chirurg., 1877, viii., 239.
9. Destot: Traumatismes du Pied et Rayons X., Paris, 1911.
10. Quénu: Rev. de Chirurg., 1912, xlvi., 367.
11. Chaput: Bull. et. Mém. Soc. de Chirurg. de Paris, 1906, xxxii., 1047.
12. Lucas-Championnière: Bull. Soc. Anat. de Paris, 1870, xlv., 212.
13. Speed: Surg., Gyn., and Obstetrics, 1914.
14. Meissner: Beitr. z. Klin. Chirurg., 1909, lxi., 136.
15. Clavelin: Revue d'Orthopédie, July, 1924.
16. Tanton: Fractures du Membre Inférieur, Paris, 1916.
17. Arbuthnot Lane: THE LANCET, 1921, ii., 697.
18. Ferry: Revue de Chirurgie, 1924, lxii., No. 6.

(*To be continued.*)

THE DOCTOR'S MOTOR-CAR.

(FROM OUR MOTORING CORRESPONDENT.)

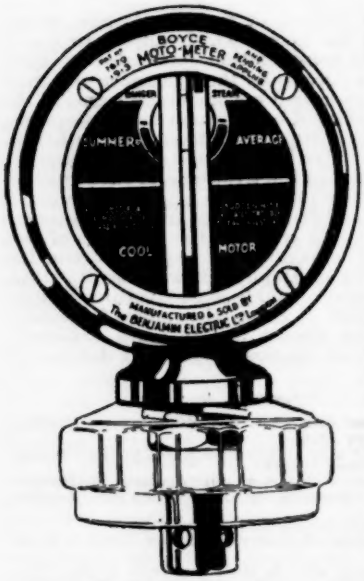
Cold Weather Accessories.

MOST engines are difficult to start in cold weather, and hardly any are now fitted with priming-taps. Flooding usually makes matters worse, as it fills the combustion-spaces with liquid petrol. The new Lodge priming plug, costing only 2*s.* 6*d.* more than the ordinary sparking plug, with a screw-off head, is, therefore, an extremely useful invention, for all cylinders can be primed without removing the high tension leads in a few minutes.

This concerns cold engines, but practitioners who have to be ready to take the car out at short notice cannot really afford to let their engines go cold. Unless some method is available of protecting the car from frost at night the circulating system must be drained, and to fill it up again requires time. There are, broadly speaking, three methods of keeping the water warm: bonnet lamps, garage stoves, and water pipes. The last are expensive and can only be fitted by a builder and decorator; oil stoves are perfectly efficient in a small garage and cost about two guineas; Davy lamps to hang inside the bonnet cost about 20*s.* There are also bonnet lamps lit from the house-current, and an ordinary carbon filament bulb gives a good heat, but electricity costs more than paraffin or even petrol for this purpose. A hot fomentation on the induction pipe, by the way, enormously facilitates starting.

Every car should have a radiator-muff made to fit it, with a flap that will allow the cooling-space to be varied. Any accessory dealer can have this done, and several dealers have stocks of muffs to fit all well-known makes. A radiator thermometer which costs a guinea (Fig. 1), is useful, since when the water temperature is known it can be regulated with the muff to the point which gives the most efficient running. Muffs cost about 15*s.* for small cars and 30*s.* if they cover the whole bonnet. The "thermostat," or automatic regulator of the water temperature, was, until recently, confined to the most expensive of cars; now it is made for about 30*s.* and fits into the rubber pipe between the radiator and the outlet. The principle is something like that of the aneroid barometer; a valve allows an amount of water to pass proportionate to the water's temperature, and retards cooling by closing when the engine is stopped. It is only suitable where a pump is fitted. The "motorstat" is one of the best known (Fig. 2). It works by means of multiflex bellows filled with a volatile liquid which is sealed in hermetically. When the temperature of the surrounding water rises, more of the liquid vaporises, thus the bellows expand when the water is hot and contract when it is cold. The action of expansion or contraction is communicated to a valve which governs the flow of water.

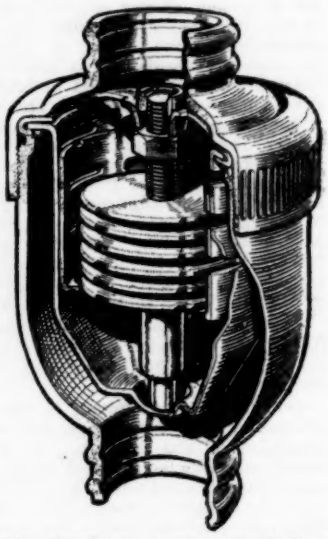
FIG. 1.



The Boyce Moto-meter.

Cold weather troubles are not confined to the engine. Rain on the windscreen is bad enough, but sleet or snow may almost blind the driver. Before the days of windscreen wipers there were various preparations sold which would prevent water from staying where they had been applied, and they usually kept the view very much clearer than the rubber squeegee. There is now, however, a cheap wiper called the "Desmo," the rubbers of which are fed with some solution from a little reservoir. This should give a clearer view than bare rubber, besides needing far less operation, as one sweep will do for an hour or so, unless it is snowing. Failing any fitted device the cut surface of a raw potato or of an apple rubbed over the glass gives some temporary relief.

FIG. 2.



The Motorstat, showing the bellows and the passages through which water flows.

Chassis Lubrication.

In the handbooks that they issue with their cars, makers instruct the owners to lubricate some bearings every 200 miles, some every 500 and some every 1000—and so on. It would be interesting to know whether there exists an owner so conscientious and obedient as to follow in detail these instructions. Chassis greasing has been immensely simplified since the introduction of the Enots, Tecalemit, and other systems, in which a set of nipples is fed by a grease-gun, but even this process takes a fair amount of time. Many busy practitioners grudge the time given to anything connected with maintenance of a car, and some of them never touch a grease-gun till they hear a squeak, and perhaps not even then. By the time a bearing squeaks, however, it has begun to wear very badly, and no amount of greasing afterwards will make up for the damage already suffered, and so the prudent owner-driver, however rushed, must make a compromise. Not all parts need the same attention. There are roughly three classes: those in constant motion, those in intermittent motion, and those that move only occasionally. The gear-box and back axle give little trouble, as they usually have large openings. It does not pay to over-grease, but at the same time the lay-shaft and crown wheel respectively must dip well into the lubricant, and inspection once a fortnight should be ample. The main universal joint, just behind the gear-box, and (if the gear-box is away from the engine) the clutch-shaft universal joints are liable to be forgotten, These parts are under constant stress and friction and cause a very unpleasant backlash when they get worn; they should be kept full of grease, which means replenishment at least every fortnight. The most important units are the springs, because there is nothing so irritating and so difficult to remedy as a spring squeak. If they are of the short "quarter-elliptic" type there is no greasing to do, but if they have shackles they must be greased thoroughly every week. It makes for easy riding to keep the gaiters full as well. The same applies to

the steering, for this is also under intermittent stress and gives bad trouble if it gets loose.

The brakes are about the only mechanisms that can be neglected for long periods with any degree of impunity, for they move so little that there is no particular danger in waiting for a squeak. It is not advisable, however, to neglect any part, and when one pedal has to work four brakes the less friction it encounters the better.

The road wheels hold grease well as a rule, but should not be left for more than three months. The clutch bearing, which most owners ignore, is in constant motion and takes the thrust of the clutch springs whenever the pedal is depressed. Unless it is attended to about every fortnight it will wear loose and spoil the charm of driving by its noise. To sum up, to wait for a squeak is not necessarily dangerous, but it is expensive, as the car's life, and consequently its second-hand value, may be greatly reduced.

Distinguishing Badges for Doctor's Cars.

The question whether doctors' cars should be distinguished by some kind of badge has recently been discussed in the motoring press. It is argued that ambulances and fire-engines are privileged in traffic, and that doctors are engaged on equally urgent duties. Moreover, a doctor's car often has to be left at some distance from an official car park. Again, those standing by victims of wayside accidents should be able to recognise a doctor and summon him to assist. It is doubtful whether medical men as a whole would press for such a badge. Even collective advertisement is against the spirit of the profession, and the degree of the elegance or luxury of his car would not be a useful addition to the ways in which the public may assess the skill or success of an unknown doctor. The practitioners in any given locality are usually well known to the police, and these, on the rare occasions when the matter is really one of minutes, always seem ready to facilitate the passage of his car through traffic.

HEALTH OF THE ROYAL AIR FORCE.

NEARLY all the items of the Report [1] on the Health of the Royal Air Force for 1924 show improvement on those for the previous year, and the Medical Service can congratulate itself on a distinct advance. The only seriously discouraging feature is the increasing number of accidents in flying, and for this increase explanations are offered which will be mentioned later. The report itself contains elaborate analyses of the data on which it is based, and a series of these documents, even for so small a force, will form a useful record.

During 1924 the average strength was 31,622 men, of whom some 9000 served abroad. The average strength for the three previous years was about 29,000, and compared with these years there were fewer men admitted to hospital, fewer invalided, and fewer sick daily. The total number of cases of disease and injury was 32,337, which is equivalent to a case ratio of 1019 per 1000 of strength (1227 per 1000 in 1923); but if cases of less than 48 hours' duration be excluded the case ratio becomes 464 per 1000 as against 474 in 1923. The number of men daily on the sick list, which was 27 per 1000 in the three previous years, fell to 24·6 in 1924. This figure is for the whole force, but the improvement was seen both in Great Britain (19·5 per 1000) and abroad (37·2 per 1000); the average number of days' sickness per head was also reduced. These last figures illustrate the comparative unhealthiness of foreign stations, and this is further shown by the fact that the death-rate abroad was 6·5 per 1000, whilst that at home was only 3·7.

Accidents and Injuries.

A regrettable increase in the mortality of the total force—it rose from 3·9 per 1000 in 1923 to 4·5 in 1924—corresponds with a greater number of flying accidents, and these have also helped to bring up the total injury rate from 65 per 1000 in the previous three years to 73 per 1000 in 1924. The number of injuries in the whole Air Force was, in fact, about 2250, excluding heatstroke and the like, and it is surprising to learn that about half of them were injuries to the legs, and that over 36 per cent. were incurred during athletics. There were only five men wounded by hostile gunfire and none of them succumbed; but there were three deaths amongst 22 cases of accidental gunshot wounds.

The percentage of injuries actually resulting from flying accidents on duty—namely, 7·5—seems comparatively small; but it must be remembered that 41 per cent. of these—that is to say 69—were fatal, and that they occurred mainly amongst officers. During 1924 34·8 officers in every 1000 were injured whilst flying, and of these 14·4 were killed; whereas for airmen the total injury rate was only 2 per 1000. The number of flying casualties has increased steadily from 86 in 1921 to 169 in 1924, but it is stated that the number of "hours flown" has increased each year even more. Aircraft, moreover, are increasing in size and carrying capacity, and consequently a greater number of personnel is exposed to the risk of injury in the event of a crash. In 1924 four collisions in the air accounted for 10 deaths, whereas no deaths from accidents of this kind were reported in 1923. It is stated that the number of hours flown per fatal accident was higher in 1924 than in any of the previous years.

The Specific Diseases.

For all types of venereal disease the case incidence showed a reduction from 26·2 per 1000 in 1923 to 22·3 in 1924. The number of primary cases—i.e., those reporting for treatment for the first time after contracting infection—fell as low as 16·3 per 1000, which decrease was largely accounted for by a fall of 2·1 per 1000 in the rate for primary gonorrhœa. The case incidence abroad remained as high as 30 per 1000, compared with 19·2 at home; but the steady general improvement in the last four years shows that the measures (including prophylaxis) described in the report for 1921 are having their effect, whilst the contrast with the naval figures—the number of fresh venereal infections in the Royal Navy [2] in 1922 ("Total Force") was 83 per 1000—is very remarkable. Of upper respiratory infections there was in 1924 a general increase everywhere except in Iraq. The Mediterranean littoral is the most unhealthy area from this point of view, and India is the healthiest. Influenza accounted for over 1000 cases throughout the Air Force, but there were no deaths from this cause. Pulmonary tuberculosis affected 42 persons, four of whom died.

Interesting figures are shown of disease and injury amongst men of different ages and trade groups, from which it appears that the highest disability rate—from sickness and injuries—is found amongst boys, and that the lowest sickness incidence is found amongst aircraft hands. The age-group in which disease is most rife is 24–25 years, and for these ages the number of primary cases of venereal disease is 42 per 1000. The healthiest group is of men from 21–22 years.

Unhealthy Foreign Stations.

As has been remarked, the foreign stations account for a high percentage of disability. The disease rates abroad were 72 per cent. and the injury rates 22 per cent. in excess of those for the home forces, and at Basrah, in Iraq, the most unhealthy of the stations, there was amongst the strength of 579 a disease incidence of over 108 per cent., apart from cases lasting under 48 hours; 74 per cent. of these were accounted for by sandfly fever, dysentery, and malaria. Throughout the Air Force abroad the incidence of malaria was 118 per 1000, which was a slight increase; but there was a distinct reduction in the number of primary cases. A steady annual

[1] Report on the Health of the Royal Air Force for the Year 1924. London: H.M. Stationery Office. Pp. 84. 4s.

[2] THE LANCET, 1925, ii., 987.

reduction in sandfly fever has also occurred, probably on account of prophylactic measures suggested in the report for 1922. Amongst the features of the account of the forces abroad is the record of an outbreak of 46 cases of bilharziasis at Hinaidi, the largest station in Iraq, where some 2000 men are stationed.

The report concludes with a description of the procedure [3] in examining recruits for flying and of the results obtained both then and at the annual re-examinations for officers and airman pilots. A short account is also given of the attempts being made to improve accommodation and sanitation. That such attempts are on the whole successful is evident from the envious remarks often made by other members of H.M. Forces abroad about the quarters enjoyed by the Air Force.

IRELAND.

(FROM OUR OWN CORRESPONDENT.)

Medical Registration in the Irish Free State.

IT is stated that the Government of the Irish Free State is about to introduce a Bill for the purpose of prolonging the present system of medical registration by six months from next February, and of empowering the Executive Council to carry it on for a further period of three months, if this be deemed necessary. It is hoped that within the time thus allowed it may be possible to devise a satisfactory system to replace the present one. It is known that the Government and representatives of the medical profession have been in conference on several occasions, and it is hoped that a scheme satisfactory both to the Government and to the profession may be devised.

County Medical Officers of Health.

The Department of Local Government and Public Health has issued to the various county councils a circular on the appointment of county medical officers of health. Attention is drawn to the provisions of Section 21(1) of the Local Government Act, 1925, which lay down that "the council of every county shall appoint, with the approval of the Minister, for every county health district in such county a medical practitioner duly qualified as such and with such other qualifications as may be prescribed, to be the superintendent medical officer of health of such county health district, and such officer shall be known as the county medical officer of health, with the distinguishing name of such county health district." The Minister is satisfied that the success of the new system of public health administration will largely depend on the proficiency of the persons chosen to fill the position of county medical officer of health. The possession of the Diploma of Public Health or equivalent degree will be an essential qualification, and should be supplemented by practical experience. The Rockefeller Foundation has generously undertaken the training of three medical men in public health work. Furthermore, it is recognised that the position of the existing tuberculosis officers possessing the D.P.H. is entitled to special consideration, and arrangements have accordingly been made with the Society of Medical Officers of Health to enable such officers seeking appointment as county medical officers to acquire further administrative experience and a more intimate knowledge of the manifold activities of public health work. These measures are calculated to ensure for the senior positions of the health service of the county a supply of highly qualified competitors. In the circumstances the Minister has decided that, as a condition precedent to his approval, the principle of a selection committee, which has already been found satisfactory in connexion with dispensary posts, shall apply to all appointments as county medical officers of health. A Bill will shortly be introduced to regulate the future procedure concerning appointments of officers of local authorities. The work in some of the smaller counties will not be such as to afford whole-time employment, and in these cases recourse will be had to a joint appointment with a neighbouring county, accompanied by equitable adjustment of the cost. On the other hand, in a county of extensive area it will rest with the county council to consider the question of subdivision. The Minister does not expect that any appointments can be made before April 1st, and he will communicate further with the county councils as to the steps they should take.

[3] THE LANCET, 1925, ii., 748.

Irish Medical Committee.

Several grievances from which Irish medical men suffer were discussed at a recent meeting of the Irish Medical Committee. For some time past Poor-law medical officers who act as registrars of births, deaths, and marriages have been discontented with the remuneration given for their services. Recently attempts have been made to increase their clerical duties, while some of their sources of emolument have been taken from them. Their fees have remained unchanged since the introduction of the system of registration, and are much less than the fees paid in England. The discontent is so great that it is not unlikely that many registrars will resign their posts unless the Government make some attempt to satisfy their demands. If the medical registrars resign, the system of registration will suffer much in efficiency. The Post Office authorities have recently notified the medical attendants on their postal staffs that a lower capitation rate will in future be paid to post office medical attendants who are attendants to the Civic Guards than to those who do not hold both appointments. There is no justification for this lowering of a scale already poor. The Irish Medical Committee also expressed dissatisfaction with the remuneration paid to medical inspectors on the staff of the Department of Local Government and Public Health. The best paid of these gentlemen are paid on the same scale as their predecessors of 70 years ago. On the other hand, in some recent appointments the scale has been lowered, and inspectors have been appointed at a salary of £500 a year with *second*-class travelling expenses.

A Board of Health in Difficulties.

The County Galway Board of Health seems to have involved itself in deep financial difficulties. It is found that its income for the current financial year will fall short of its expenditure by some £12,000 or £15,000. In these circumstances the Board has simply made a request to its various officers and employees that they should consent to a diminution of 10 per cent. in their salaries for the next three months. It is suggested that unless they agree to this demand they are likely to get nothing at all. It is hardly to be believed that the Department of Local Government and Public Health will permit the health authority of the largest administrative area in the Free State to evade its liabilities by an appeal to the charity of its employees. That the Board has been allowed to go so far in its mismanagement is evidence of a lack of proper supervision by the Department. The only way out at the moment appears to be the suspension of the Board of Health and the appointment of a commissioner to administer its affairs.

BUDAPEST.

(FROM OUR OWN CORRESPONDENT.)

Alcohol and Tuberculosis.

SINCE America introduced the "dry" law the statistical data on the occurrence of tuberculosis in conjunction with alcoholism have been the subject of lively study in several European countries, and particularly in Hungary. Prof. Dr. Julius Donath, whose name is well known abroad from his studies on the rôle of cholin in the causation of epilepsy, has just published the results of his researches. He proves by facts and figures that the effects of cleanliness, good nourishment, fresh air, and sunshine in

the treatment of tuberculosis can all be counterbalanced by the action of alcohol. He refers to the observation of Martin, that although the Chinese are continually sinning against the rules of hygiene, and their food is mostly unwholesome owing to their poverty, nevertheless tuberculosis is incomparably less frequent in China than amongst European people. The only weapon of the Chinese against the disease is sunshine (which they have in abundance), and their comparative freedom may be attributed in the first place to their modest consumption of alcohol. According to Donath, the object-lesson of the intemperate use of alcohol has been taken to heart by few countries, a notable exception being Finland, which prohibited alcohol as soon as it became independent. Two other Scandinavian countries, Iceland and Norway, have been prevented from enforcing prohibition by reason of economic causes. Their main article of export, fish, is purchased by their greatest customers, Spain and Portugal, only under the condition that they allow heavy wines from those countries to be imported into their lands. The only important State where the effects of dryness can be properly studied is the United States of America. Here it can be shown with most reliable figures that the tuberculosis mortality decreased between 1914 and 1923 by more than 100 per cent. The huge sums which were previously spent on alcohol in the U.S.A. (about two milliards dollars yearly) are spent now in improving the conditions of living. Hungary provides a contrast to such blessed conditions. The mortality from tuberculosis is ever on the increase, and there has been a rise from 2959 deaths from the disease in 1921 to 3292 in 1924. It is interesting to note that according to the official statistics tuberculosis mortality in the Jewish population of the country was 21·3 per 1000, in Protestants 38·5, and in Catholics 55·1. Dr. Donath's report has made a deep impression upon the Hungarian Government, and in well-informed circles it is taken for granted that a Bill will shortly be introduced that will greatly restrict the consumption of alcohol, by prohibiting the sale of liquors in certain hours of the day, and by raising the tax, which will incidentally provide means to support public welfare institutions.

The Problem of "Es."

Dr. George Groedeck, the eminent psycho-analyst, gave an address in the Circle of Lawyers on the treatment of bodily and mental diseases. He said that psycho-analysis cannot, by any means, be applied in lieu of the methods hitherto used; it may be resorted to only in cases where these methods are of no avail. Such cases are those in which there is a tendency in the organism of the patient towards a certain disease; the patient directly wants the disease; he wants to pose as the centre of events. Other cases are those in which the patient desires to atone for something, and therefore feels a certain velleity towards a certain disease. An example of this was the woman who wanted to kill a man, but on encountering him, when she ought to have acted, slipped on the pavement, fell, and broke her arm, which she wanted to raise against another human being. This was not caused solely by the wish for atonement, but something else also was accountable for it—namely, the moral feeling which was still present in the woman, and which wanted to prevent her committing the crime. In both cases the motive power is something incomprehensible and indefinable, which takes root in the extreme depth of the human being, of the human organism—what Nietsche calls *Es*. This is not the conscious Ego, nor the Freudian subconscious, but rather something metaphysical, that cannot be denoted by any other term than that of Nietsche. This *Es* is responsible for those situations in which medical science stands impotent; in which everything done for the patient proves vain because *Es* moves towards the disease. The task of psycho-analysis is to direct the attention of the patient to the intention of the *Es*, and to deflect it in another direction. It may happen, said Dr. Groedeck, that psycho-analysis will be swept away by the future and that we and our method will be entirely forgotten; but this cannot disturb us, because we are living in the present. We are surveying this difficult problem from this point of view, and we are trying to solve it.

Imminent Strike among the Junior Dressers of the University Clinic.

The critical economic position of Hungary is being felt in the universities. Whilst in pre-war times sacrifices for the advancement of science knew no limits, and the Budapest University was one of the first to adopt all new appliances regardless of cost, the situation at present is such that only the most necessary outlays are approved by the Ministry. Economy is the principle in every line, and unfortunately it is very detrimental to the training of medical students. The last Order of the Ministry of Public Instruction related to a reduction of the number of junior dressers in the university clinics. Out of about 300 dressers only 25 had some nominal salary, and these were all older dressers, who had acquired their medical diploma several years ago and had served in this capacity for more than three years. The Minister wanted to dismiss nine of them in order to alleviate the budget of the universities. As the professors of the affected clinics objected that this would endanger the successful teaching of the students, a conflict arose which went so far that it was feared that the rest of junior dressers—about 300—would declare solidarity with the dismissed ones, in which case the teaching would have suffered a great deal. This Order to the dismissed dressers was most offensive, for the Ministerial Order wanted them to continue working without any salary. If they accepted it, this would mean their degradation, because having a salary gave a certain distinction to the advanced dressers. The medical staff of the university clinics—professors, adjuncts, assistants, practicants, and dressers—held a meeting at which, after several fiery speeches and hot remarks, the professors succeeded in persuading the younger clinicians to refrain from overhasty steps, because there was hope that the Minister would retain the paid dressers in their position if he heard about the meeting and the atmosphere which ruled there. Direct negotiations were then opened between the Premier himself, Count Bethlen, and Count Klebelsberg, Minister of Public Instruction, and eventually the Order was withdrawn. Thus 130 million crowns—about £520—saved the Budapest University from an academic disaster.

Tutocaine in Ophthalmology.

The second ophthalmological clinic of the Budapest University has applied tutocaine in 250 cases. The results, as recorded by Prof. Hoor, the director of the clinic, are not very satisfactory. A report, published in the *Orvosi Hetilap*, No. 36, 1925, supports the view that tutocaine cannot compete with cocaine as an ophthalmological anæsthetic. Neither is it superior to holocaine; on the contrary, in the deeper parts of the eye tutocaine failed to produce anæsthesia, whereas cocaine and holocaine had acted promptly. It can be recommended, however, to produce anæsthesia in cases of operations performed in the superficial layers of the cornea and conjunctiva. When injected, its irritant effect on the tissues is greater than that of novocaine, while it does not render the field so bloodless. Its only advantage over novocaine is that its anæsthetising power is of longer duration; on the other hand, it may compete with it from the point of view of cost, because, according to some authors, half the quantity of tutocaine suffices to attain the same effect as produced by novocaine.

Compulsory Notification of Malaria.

The Minister of Public Welfare has issued an Order enacting the compulsory notification of malaria in towns and cities to the chief medical officer, and in the country to the district physician. The Minister was induced to do so on account of the great number

of cases of malaria occurring at some parts of Hungary, showing a decided epidemic character. If notifications are made on a wider scale the Minister will make provisions for the enlightenment of the rural population through popular lectures and instructive films.

SOUTH AFRICA.

(FROM OUR OWN CORRESPONDENT.)

Cape Town and Venereal Disease.

CAPE TOWN appears to have taken a retrograde step in regard to the treatment of venereal disease. A good deal of pioneer work in this respect has been done by the South African branch of the National Council for Combating Venereal Disease, now to be known as the South African Society for Social Hygiene. Under the auspices of its council venereal clinics were established a few years ago in a convenient quarter of the city, and voluntary help was given by medical men and women. Subsequently, the health department of the Cape Town Corporation decided to take over the work and appoint their own medical officers. This they did, retaining some of the voluntary workers on their paid staff. A few months ago the health committee of the city council, against the advice of Dr. Shadick Higgins, their medical officer of health, and in defiance of the wishes of a representative deputation, decided to close the original clinic and dispense with the services of the two medical women who had successfully conducted the tri-weekly clinics for women for the past four years. The reason given for this move was that of economy, and it was urged that a clinic at the City Hospital would meet the needs of both men and women and save the fees now given to part-time medical officers. It remains to be seen whether the attendance of patients under these new conditions will maintain their average of the past few years.

Self-Government in a Leper Institution.

A leper institution in the Transkei, S.E. Cape Colony, has of late years been the scene of an interesting experiment in administration. The institution is practically governed by the lepers themselves. Five headmen are elected from amongst the patients and these are responsible for the discipline of the whole. Any patient breaking the rules is tried by these headmen in the presence of their fellows and the punishment, if any, is determined by the headmen and patients in council. There is a right of appeal to the superintendent and, through him, to the Union Government, but this is practically never exercised. Admirable results have followed the introduction of what in schools would be called the prefect system. Under the old system of control 40 native guards serving under six European officers were kept constantly employed, and a man-proof fence enclosed the whole leper location. Under the new régime the guard has been reduced to 18 natives, of whom half are patients, and two European officers. The man-proof fence has been replaced by one of the usual sort, and beyond a roll call every morning and evening no methods are taken to prevent escapes. This enlightened system of control has now been in force for four years and owes its inception to the superintendent, Mr. J. W. Macdonald, who laboured hard for improving the comfort and happiness of the lepers. The statistics of escapes before and after his arrival testify to his success. Previous to 1922 as many as 60 lepers would attempt escape during the year. Since that year the highest number reached is six and the lowest three. The institution is, moreover, run on lines of sound economy. Large farming operations are undertaken, and all butter, milk, meat, and vegetables required for the patients and staff are supplied locally. Trees are also grown for firewood. Most of the work is done by the more able-bodied amongst the lepers and these are paid for their labour. The money thus earned is sent home to their relations and forms a link between the sufferer and his friends, which is much valued by both. A shop on the premises provides the lepers with any little luxury at cost price. Schools and creches are provided for the younger inmates.

Visit of the Medical Secretary of the B.M.A.

Dr. Alfred Cox, medical secretary of the British Medical Association, is at present on a visit to South Africa. Dr. Cox's ten days on the Rand were occupied in visiting the Rand hospitals, the medical school, the South African Institute of Medical Research, the Miners' Phthisis Bureau, and the Witwatersrand Native Labour Association Hospital. He was entertained to lunch on Nov. 25th, at the Scientific and Technical Club, Johannesburg, by the Witwatersrand branch of the B.M.A., and he was present at the annual dinner of the branch held on Nov. 26th at the Carlton Hotel, Johannesburg. At this dinner about 100 members and guests were present, and the chair was occupied by Sir Spencer Lister. Sir Julius Jeppe proposed the toast of the British Medical Association. In reply, Dr. Cox said that he hoped to see London made the centre of post-graduate work in the Empire. The B.M.A., he said, had been formed on the model of the British constitution. They were a collection of families of medical men scattered over the Empire. In England, as the parent body, they were called to help the other branches. But they never interfered with them. They laid great stress on the fundamental maxim that the patient came first.

Bloemfontein Hospital Board.

At the monthly meeting of the Bloemfontein Hospital Board held on Nov. 24th, under the presidency of the Rev. F. P. Roth, strong opposition was voiced to a recommendation from the medical committee advising that patients should either be free patients or should pay a minimum of 10*s.* a week. The committee held that those patients paying 7*s.* 6*d.* a week should either be made to pay the full 10*s.* or be made free patients. Several members of the board took exception to this recommendation of the medical committee on the grounds that it was unfair to label as paupers those who could only afford to pay less than 10*s.* Dr. van Rippen, speaking as a medical man, said that to his knowledge many who did not at present pay 10*s.* a week to the hospital could well afford to do so. The recommendation was not accepted.

Training in Mother-Craft.

To Cape Town belongs the distinction of having the first mother-craft training centre in South Africa. This has been recently started through the untiring efforts of the Child Welfare Protection Society, which is the Cape Colony branch of the National Council of Child Welfare. A wing of the Society's home for infants and young children, known as the Lady Buxton Home, has been adapted for teaching purposes and a newly added hostel provides accommodation for the students. These include (1) trained nurses who take a four-months' course in infant dietetics; (2) midwives who remain for six months: (3) untrained students who wish to qualify for the position of domestic nurses. Their period of training lasts one year, and includes the care and management of infants from birth up to the age of 6 years.

HOSPITAL ACCOMMODATION AT SWINDON.—There has long been a serious hospital problem at Swindon, the headquarters of the Great Western Railway works, with a population of some 90,000. The Great Western Hospital of 15 beds was established by the railway company to meet the needs of their employees, but their wives and children have to make use of the Victoria Hospital, which has 25 beds and seven cots. The combined accommodation is entirely inadequate, and proposals have been made for the enlargement of one or other of these institutions. Two years ago Mr. Roden Orde recommended the establishment of one hospital for the whole population with from 150 to 200 beds. The Swindon Town Council has just appointed a committee to consider the possibility of establishing such a hospital, and its cost.

SEXUAL OFFENCES AGAINST YOUNG PERSONS.

REPORT OF THE HOME OFFICE COMMITTEE.

THE Report of the Departmental Committee on Sexual Offences against Young Persons sets out fully the conclusions reached by the Committee after considering the evidence of some 75 witnesses, including judges, magistrates, barristers, chief constables, medical officers, police surgeons, and representatives of the Church of England, the Home Office, Board of Education, local authorities, the Six-Point Group, and other bodies. The recommendations of the Committee are summarised in Section IX. of the report as follows:—

FORTY-THREE RECOMMENDATIONS.

1. That the annual criminal statistics should contain a separate table giving complete returns as to sexual offences which are against young persons, and that the statistics for "attempts" should be shown separately from those for the full offence.

2. That it should be made an offence, triable summarily and governed by the law as to indecent assaults, for a male person to commit an act of gross indecency with a young person, male or female, under 16; that the young person shall not be prosecuted for being concerned in the offence.

3. That courts of summary jurisdiction shall have power to grant a separation, maintenance, costs, and the legal custody of her children, to a wife whose husband has been convicted of incest, carnal knowledge, or of the attempt, or of a grave indecent assault, upon one of his daughters.

The Age of Consent.

4. That the age of consent shall be raised to 17, with amendments to the law consequent thereon.

5. That the defence of reasonable belief that a girl was 16 or over shall be abolished; that where there are extenuating circumstances a young man found guilty on indictment and placed on probation, shall not have a conviction registered against him.

6. That 12 months shall be the time limit for taking proceedings under the Criminal Law Amendment Act, 1885, Section 5 (1).

7. That the jurisdiction of petty sessions shall be extended to try, where the accused consents, offences of gross indecency; and of attempts to have carnal knowledge of a girl under 13, or under 16; and of attempted incest with a girl under 16. That power be given the justices to imprison up to 12 months for attempted carnal knowledge and for attempted incest.

8. That quarter sessions shall have power to try all sexual offences against young persons, provided that the Court is presided over by a recorder, or by a chairman or deputy having professional legal experience.

9. That in indecent offences properly trained women shall take the statement of girls; but where this is not possible, that a woman shall be present while the policeman is taking the statement.

Examination by a Medical Woman.

10. That where a medical examination of a girl is necessary it should, whenever possible, be carried out by a woman doctor.

11. That where proceedings are instituted by summons, such summons shall be made returnable early.

12. That chief constables shall be asked to consult the Director of Public Prosecutions in cases of defilement of girls under 13, and of indecent offences upon a number of children, and of offences in which disease has been communicated to children or young persons.

13. That in all except the simplest cases a solicitor shall be engaged to assist the prosecution in sexual offences against young persons.

14. That separate waiting rooms for young persons shall be provided by all courts.

15. That magistrates shall, whenever possible, take all cases of sexual offences against young persons at a fixed time convenient to the child and its guardian; and that in petty sessional courts with short lists these cases shall be taken first, or after the short cases have been disposed of. That where the evidence of a young person is necessary and available, a remand shall not be granted till his or her evidence has been taken.

16. That courts of assize and of quarter sessions shall take these cases first, whenever possible, after the pleas of "Guilty" or after the emergency cases have been disposed of.

17. That courts should be reminded of the power to dispense with the attendance of young persons under Section 31 of the Children Act, where their evidence is not required.

18. That young persons shall not be required to attend before the grand jury, provided that the bill shall not be ignored without hearing the evidence of the young person.

Procedure in Court.

19. That attention shall be paid to the position of the young witness in court, so as to lessen the distance the voice has to carry, and so that he or she shall not be face to face with the accused at close quarters.

20. That a suitable woman shall always be present in court to the knowledge of the girl witness. That a matron shall be available to take charge of young witnesses while waiting to give evidence.

21. That wherever a woman is entitled to sit as a magistrate, she should be asked to attend on the bench when girls are concerned in a case of indecency.

22. That, subject to certain reservations made, the court shall be cleared when young persons are giving evidence as to an indecent offence, and that at no time shall a young person under 16 remain in court, unless his or her presence is specifically required.

23. That, wherever justifiable, the evidence of a child who can tell a connected story shall be taken upon oath.

24. That those initiating or conducting prosecutions should bear in mind that in view of the decision of the Court of Criminal Appeal in R. *v.* Crocker, the absence of corroboration is not a bar to the securing of a conviction.

25. That the extreme difficulty of bringing to justice an offender committing offences against a number of children separately, shall be rectified by Parliament.

26. That neither the name, address, nor photograph of a young person concerned as a witness, or as a young offender, in these cases shall be published, except by the express authority of the court.

27. That the words "from birth or an early age" and "from an early age" shall be deleted from Section 1 (*c*) and 1 (*d*) respectively, in the Mental Deficiency Act, 1913.

Mental Report before Sentence.

28. That after conviction, but before sentence, the bench shall remand, for a mental examination and report, all cases of indecent exposure, all sexual offenders previously found guilty of an indecent offence, and all cases in which the court suspects mental disease, disorder, or defect.

29. That all courts shall make arrangements for the services of a mental expert to be at their disposal.

30. That those who commit repeated indecent offences against young persons should be subject to prolonged detention in suitable institutions.

31. That the penalties imposed for sexual offences against young persons should be adequate to the circumstances of the case.

32. That legal aid, and better facilities for appeal, for offenders tried summarily, should receive consideration.

33. That courts trying sexual offences against young persons shall refer to the petty sessional court the question whether the further protection of the young person is necessary; and that the justices shall take action, if the case requires it, in the interests of the young person or of his or her brothers or sisters.

34. That the words "unlawful carnal knowledge" shall be inserted before the words "seduction or prostitution" in the Criminal Law Amendment Act, 1885, Section 12, and in the Children Act, 1908, Section 58 (1) (*g*).

Amendment of Children Act.

35. That the Children Act, 1908, shall be amended as follows: (*a*) First schedule.—Incest to be added as an offence. (*b*) Section 20.—The police to coöperate with local social workers where it is necessary to remove a child temporarily to a place of safety. (*c*) Section 21.—Payment from public funds to be available for a young person committed to the care of a "fit person" (under Sections 21, 58 (7), or 59, respectively); the address of the young person so committed to be notified to the court; institutions which represent the "fit person" to be approved, registered, and regularly inspected. Power to be given to take action for the protection of young persons offended against by the man cohabiting with the mother. (*d*) Section 58 (1) (*b*).—The words "is found wandering and" to be deleted before the words "having no parents." (*e*) Section 58 (1) (*c*).—Incest, unnatural offences or indecent assault by a father on one of his own children to be a ground for taking measures of protection on behalf of his sons or daughters. (*f*) Section 58 (1) (*g*).—Procuring or aiding or abetting by either parent to be a ground for taking action on behalf of any, or all, the children who are in moral danger.

36. That there shall be power to deal with young persons who are beyond control as outlined in the report.

Condition of Special Homes.

37. That voluntary societies and workers should discriminate more carefully as to the children sent to special homes, and as to older girls sent to rescue homes; that they should receive reports as to progress, and should make arrangements for the return of the child or young person to a more natural environment as soon as possible.

38. That where the child victim of an offence has to be removed from its home, boarding out under proper safeguards shall, where possible, be resorted to; that the age limit for boarding out in the Children Act should be abolished.

39. That children committed to special homes shall only remain until they have recovered, and shall then return to their parents, or be boarded out, or be sent to an ordinary home or industrial school.

40. That where the court makes a probation order conditional on residing in a home, it shall be one which is approved, registered, and inspected; and that the period of training shall not exceed six months without careful review by the court.

41. That the statutory requirements as to the care of children employed in entertainments shall be extended to include the care of young persons up to 17.

42. That there should be better supervision in parks, in fairs, in cinemas, and in school precincts.

43. That student teachers should receive instruction at college as to the best methods of giving older children, individually, instruction on matters of sex.

We comment on another page upon some medical aspects of this many-sided report.

Public Health Services.

REPORTS OF MEDICAL OFFICERS OF HEALTH: A BRIEF SURVEY.

THE Ministry of Health has issued the usual circular with regard to these reports for 1925, an exceptional feature being the intimation that a survey report, indicating the measure of progress made during the preceding five years, is required for the year 1925.

We have commented on many of the 1924 reports. The year 1924 was a wet and cold year, and was characterised by a considerable prevalence of influenza in the first quarter, followed later by an increased prevalence of encephalitis lethargica in many districts. The death rates were in consequence not usually so favourable as in 1923, and respiratory diseases were responsible for increasing both the general death-rate and infant mortality. Some districts, however, succeeded in scoring their lowest infant mortality rates on record. Typhoid fever of the usual type was not prevalent, but a number of outbreaks of paratyphoid were reported. Occasionally these were associated with carriers and milk infection, but in many cases they occurred in the early summer, affecting chiefly women and children, and no food cause could be found. Small-pox of a very mild type was endemic in several districts, but the virulent type appeared in a small outbreak at Willesden. The question of immunising for diphtheria has made some progress. It is now used for the staffs of many fever hospitals, and has been applied in the case of Edinburgh to school-children on a large scale. Serum immunisation against measles has also been used in Glasgow.

There appears to be an almost general shortage of hospital accommodation for surgical tuberculosis. As yet the results obtained by the training of tuberculous ex-Service men do not appear to be very satisfactory. Some very high death-rates from cancer were reported, and local cancer investigation committees have been established in several districts. Venereal diseases show a decline, especially in new cases of syphilis, and the better facilities provided at the centres are reflected in the increased number of attendances per case.

As regards maternity and child welfare, it cannot be said that much progress has been made in preventive midwifery, designed to cope with the high maternal and neonatal mortalities. Several districts report a difficulty in stopping the practice of "handy women." There are signs of better coöperation between the county councils and the urban districts responsible for maternity and child welfare schemes. Many of the county councils are making strenuous efforts to attain the ideal that no village shall be without its properly qualified nurse-midwife, and for this purpose the services of the voluntary nursing associations are being well utilised. Light treatment is being installed at many of the centres for the use of children of pre-school and school ages. Considerable progress has been made in many districts in the organisation of complete schemes for dealing with crippled children. An advance has also been made towards the unification of the public medical and nursing services.

Among school-children there is much need for more complete dental treatment, and several school medical officers refer to malnutrition in school-children due not to insufficient food but to the wrong kind of food.

The introduction of the regulations for graded milk has certainly given a fillip to the improvement of the milk-supply. The sale of graded milks has made little headway, but, on the other hand, the agricultural committees of many county councils have held clean milk competitions and stirred up an interest in this question by means of lectures and demonstrations. The examination of milk for tubercle bacilli shows that there is no decrease in the frequency of tuberculous udders, and the reintroduction of the Tuberculosis Order is anticipated with satisfaction. Rural districts are beginning to take up the periodical inspection of milch cows.

The housing question is still a great difficulty. Few districts have been able to catch up any arrears, and the majority have been unable to provide for the natural increase of the population. Here and there, however, there was a more optimistic note. The smoke abatement question remains much as it was. The regional area scheme for the Manchester district which aroused some interest has been turned down since.

The need for education of the public in health matters has been urged in many reports, and Blackburn has given a notable lead in this respect. Perhaps the chief gains of the year have been improvements in administration. One example is coöperation between the local authorities and the voluntary hospitals and nursing associations; another is the pooling of hospitals for infectious diseases in county areas. The establishment of the Sheffield Medical Advisory Committee is another good example of coöperation, and we have already mentioned the organisation of schemes for cripples and the unification of the public medical and nursing services.

SCHOOL MEDICAL SERVICE.

A SURVEY OF 1924.

THE ever-increasing scope of school medical work in addition to the routine examination of every child at least three times in the course of his school career is becoming one of the prime factors in preventive medicine. Each year sees a closer linking-up with antenatal and child welfare schemes and a more complete coördination of all health activities, both public and voluntary, bringing the medical officer into close touch with the general practitioner and the consultant and making for harmony in the common interest of prevention and of early recognition and treatment of disease. The school has now become the clearing house for incipient diseases.

Not least of the great services rendered by school medical workers is the quickening of interest amongst the lay public in general and personal hygiene. Throughout the country 60 per cent. of the parents attend the medical inspection and greater advantage is being taken each year of the wide facilities provided for advice, help, and treatment. The mental attitude of the public has undergone a complete change;

personal uncleanliness and verminous conditions are now viewed with shame. Advice and practical teaching on personal hygiene, dietetics, clothing, lighting, exercises, &c., together with better general hygiene have already resulted in a widespread general improvement in the physique and bearing of the present-day elementary scholar, while there has been a marked decline in mortality at school and pre-school ages during the past 20 years. The child of yesterday as the mother of to-day is putting into practice the lessons already learned.

The enormous amount of dental caries gives colour to the belief that nature is finding little use for the teeth and is now treating them as foreign bodies. Whatever be the cause or causes of the decay, dental caries is being tackled in Herculean manner by the school dentists and much propaganda is carried on by them in the way of lectures to the parents. The reports of school medical officers leave one in no doubt as to the advisability of removal of septic tonsils and adenoids. Aural surgeons are unanimous in their condemnation of the offending member, but many and varied investigations by S.M.O.'s have traced septic absorption from the throat as at least a large contributory factor in rheumatism, chest and lung complaints, anæmia, malnutrition, general physical and mental debility. Operative treatment is usually in the hands of experienced surgeons and skilled anæsthetists, while the general aim is to keep the child in bed from 24 to 48 hours following operation.

Ionisation as a means of treatment in selected cases of otorrhœa seems to be favoured by an increasing number of aural surgeons, while many ophthalmologists point the need for the very early treatment of squint. Dirt diseases and infections—e.g., impetigo, scabies, blepharitis, and conjunctivitis—all show a decided decrease during 1924, and ringworm of the scalp is a rapidly disappearing disease. Increased inspections by nurses, together with the help and observant coöperation of teachers, are tending to minimise the spread of infections in the schools, and even the control of small-pox epidemics was helped by keeping the schools open and so ensuring better supervision of the children.

Special classes and residential schools are widely provided for the adequate training of defectives, both physical and mental. Open-air classes and schools are held where the batteries of nature are trained on the invasive powers of disease, and it is from such institutions that much of our knowledge is coming—on the best lines of tackling these defects. Since Sir George Newman stated that between 80 and 85 per cent. of all crippling defects could be prevented or cured, many authorities have started orthopædic schemes under the direct supervision of skilled surgeons and with remedial clinics and numerous training centres. The financial economy of these special means of preventing, easing or curing chronic invalidism is strongly shown in many of the school reports. Whether the bombshell of Circular 1371 will disintegrate the rising structure remains to be seen, but if the suggested "economy" falls on the medical work, it will be the most wasteful economy the country could adopt; even the exclusion of the 3- to 5-year olds would remove children at the age when most effective preventive and curative work can be undertaken, and there is, at present, no other means of bringing these children under medical observation in the mass.

The mass of material and the excellent opportunities in the examination of these great numbers of everyday children has resulted in many original observations, and few reports will be read wherein some special work is not recorded. Rheumatism has claimed wide attention, and in Bristol, Birmingham, and London, amongst many other places, useful contributions have been made on the hereditary and environmental factors as well as on early diagnosis and treatment at open-air institutions. Dr. Vincent Coates, working in conjunction with Dr. R. E. Thomas, the deputy S.M.O. of Bath, finds a useful diagnostic sign in the presence of small nodules over the spinous processes of the vertebræ and along the subcutaneous border of the ulna. Encephalitis lethargica, with its 50 per cent. mortality-rate, has called for some careful reports; in Dr. F. C. Shrubsall's (London) series of 193 cases, only 42 had apparently completely recovered, and amongst 57 cases observed by Dr. H. Herd, of Manchester, only 8 could be described as normal.

The complex question of "fitness" has attracted many observers, and Dr. J. G. Woolham, of Manchester, has evolved a series of anatomical measurements and physiological tests which, when applied to a series of boys under medical attention, showed a close positive association with the findings of purely clinical examination by independent medical men. Dr. Percy Scott examined the blood pressure in 1633 boys in London and finds that the commonly accepted rule that blood pressure rises uniformly throughout life is not supported, but that during adolescence, and particularly about the age of 16 or 17, the heart in boys is performing more work in comparison with its weight than at any preceding or subsequent period of life up to 40. He also noted that in schools where a strict discipline is maintained, the average systolic and pulse pressure of the boys are appreciably higher than in the more easy-going schools, the pulse-rate being reduced in compensation. To the healthy boy this is an advantage, but to delicate youths harm is likely to accrue from the keying up of the blood pressure.

Many other subjects of vital importance have been selected for investigation by individual members of the School Medical Service. Enough has been said to give an idea of the useful and progressive work which is being done.

INFECTIOUS DISEASE IN ENGLAND AND WALES DURING THE WEEK ENDED DEC. 19TH, 1925.

Notifications.—The following cases of infectious disease were notified during the week:—Small-pox, 180 (previous weeks, 144, 115, and 105); scarlet fever, 1835; diphtheria, 976; enteric fever, 38; pneumonia, 1832 (previous weeks 1917, 1176, and 1531); puerperal fever, 51; cerebro-spinal fever, 8; acute poliomyelitis, 8; acute polio-encephalitis, 2; encephalitis lethargica, 44; continued fever, 1; dysentery, 3; ophthalmia neonatorum, 111. There were no cases of cholera, plague, or typhus notified during the week.

Of the 180 cases of small-pox, 118 were reported from the county of Durham as follows: Gateshead C.B., 8; Blaydon, 54; Chester-le-Street, 5; Consett, 1; Durham, 1; Jarrow, 1; Ryton, 2; Whickham, 1; Chester-le-Street R.D., 7; Easington R.D., 21; Houghton-le-Spring, 6; Lanchester, 4; Sunderland, 7; and 14 from the West Riding of Yorkshire—namely, Rotherham C.B., 1; Rawmarsh, 13.

Deaths.—In the aggregate of great towns, including London, there was 1 death only from enteric fever, none from small-pox, 78 from measles, 10 from scarlet fever, 48 from whooping-cough, 30 from diphtheria, and 132 (previous weeks 116, 100, 73, and 61) from influenza. In London itself there were 31 deaths from measles, 7 from diphtheria, and 26 from influenza.

The Services.

ROYAL NAVAL VOLUNTEER RESERVE.

Proby. Surg. Sub-Lt. H. M. Willoughby to be Surg. Sub-Lt.

ROYAL ARMY MEDICAL CORPS.

Lt.-Col. R. N. Hunt, half pay list, late R.A.M.C., retires on account of ill-health.

ARMY RESERVE OF OFFICERS.

Lt.-Col. F. E. Bissell, having attained the age limit of liability to recall, ceases to belong to the Res. of Off.

ROYAL AIR FORCE.

Flight Lt. G. Kinneir is transferred to the Reserve, Class D.2.

RESERVE OF AIR FORCE OFFICERS.

P. A. Carrie is granted a commission in Class D.D. as a Flying Officer.

Correspondence.

"Audi alteram partem."

GLYCOSURIA AND LIFE ASSURANCE.

To the Editor of THE LANCET.

SIR,—May I be allowed a comment on Dr. Knyvett Gordon's letter in your issue of Dec. 19th last. The data in the letter are rather scanty, as neither the exact composition of the meal nor the time elapsing between it and the blood-sugar estimation is stated. Assuming, however, that the case really is one of a low renal threshold—i.e., one of glycosuria without hyperglycæmia—the proposer's remedy is simple: he should propose for a policy with another company. Although previous rejection would lead to a very careful scrutiny of all the facts by the second company it would by no means prevent his acceptance at ordinary rates if the circumstances satisfied the assessors that he was a normal risk. It happens quite frequently that a proposer is thus accepted by another company. Without going so far as Dr. Gordon in regarding a case of renal glycosuria as a "better risk in regard to carbohydrate metabolism than a normal man," I may say that I have recommended many such cases for acceptance if satisfactory in all other respects.

I am, Sir, yours faithfully,

OTTO MAY, M.D., &c.

Dec. 24th, 1925. President, Assurance Medical Society.

*** Dr. Knyvett Gordon's letter was published because it is well that instances which point towards arbitrary treatment in such matters should be ventilated. The case to which he alludes was recognised immediately by the company whose methods were criticised, and the following explanation has been sent to us:—

"When this proposer attended for examination he was examined by one of our own medical directors, and although Dr. Gordon says that he was 'a healthy man, of wiry physique, with clear family and personal history,' he was, in our examiner's opinion, not robust-looking—his weight was very light, he looked older than his age, and he was slightly emphysematous. Dr. Gordon says that the urine was 'boiled with a blue solution and the rest of the specimen poured down the sink'; whereas, when the urine was found to reduce Fehling's solution, the rest of the specimen was sent to one of the leading London laboratories and was tested both by Fehling's and Benedict's solution, and we also had a phenylhydrazin test made. The substance was shown to be glucose, and the quantity was 1·88 gr. per ounce. As a result of this we did not, as Dr. Gordon says, 'totally reject him,' but postponed the case for six months, and recommended the proposer to place himself in the hands of his medical adviser."

We need not enter into further details of the case, but it would seem that no careful insurance officer could have acted more justly in relation to other policyholders and with more consideration to the proposer himself.—ED. L.

IMPETIGO CONTAGIOSA.

To the Editor of THE LANCET.

SIR,—In connexion with Dr. Haldin-Davis's admirable article on the treatment of impetigo contagiosa in your issue of Dec. 19th there are a few points concerning the ætiology, course, and prophylaxis of the disease which are not, as a rule, sufficiently emphasised.

In the first place, I am convinced that it is impossible to abort an attack by local measures alone, and that, once the eruption is well established, recovery is not so much due to the local treatment we employ, however carefully and thoroughly it may be applied, but to the gradual development of immunity to the infecting streptococcus and perhaps, to a less extent, to secondarily invading staphylococci. In other words, although by our local antiseptic applications we may check the spread of the eruption and hasten its disappearance, the patient cures himself by antibody production, and I believe that most cases, if left untreated, would run a definite course lasting from two to six weeks.

During the war I developed a very severe attack when on a hospital ship in the Persian Gulf during the hottest part of the year. I treated myself assiduously for some weeks with all the resources of the ship's dispensary, but entirely failed to check the outbreak of fresh lesions. Within 48 hours of landing in the relatively cool atmosphere of Bombay, however, new lesions ceased to appear and, apart from a few dried crusts, I was well at the end of a week. Rarely, too, one meets with cases in which the disease lasts not weeks but months, in spite of the most rigorous local treatment. One case I remember well—a little girl of some 3 years of age—in which the eruption, which was of the bullous type, had been present for over two years; a long-chained streptococcus was repeatedly recovered from the early lesions and the same organism was found in almost pure culture in the nasal and buccal mucous membranes, and in fæcal cultures it predominated over the *B. coli*. An autogenous vaccine produced febrile reactions but led to some improvement. It was decided to give a polyvalent antistreptococcal serum, but the mother removed the child from hospital and I lost sight of her. Another case was that of a young man with bullous impetigo of the face, neck, and hands in whom the disease lasted at least six months; he improved with an autogenous vaccine, and eventually the eruption cleared rapidly after two injections of antistreptococcal serum. He had had thorough local treatment at two other clinics before he came under my care.

Recently I treated a patient with severe impetigo of the face, neck, and scalp, in whom the disease ran a course of about four weeks, without, I think, being much influenced by local applications. At the end of his attack his wife came to me with three or four early lesions and she complained of feeling very seedy. I thought it worth while to try to abort the attack, and she was given a dose of a mixed vaccine of streptococci and staphylococci cultured from another case of impetigo. The result was dramatic, as on the following day the lesions had dried up, she felt infinitely better, and there was no further development.

Impetigo contagiosa is not always, as many textbooks would suggest, a trivial disease. In children and in adults of both sexes it may be the starting-point of obstinately recurring streptococcal fissures and intertrigo and of secondary staphylococcal lesions, such as boils; in men, of course, as Dr. Haldin-Davis points out, the risk of coccogenic sycosis becoming superimposed on a neglected impetigo is a very real one. The prognosis depends partly, no doubt, on the thoroughness with which the local treatment is carried out, but to a greater extent, in my opinion, on the rapidity and degree of antibody production. For this reason it is advisable to insist on the patient resting completely during the active stage, and he should, if possible, lie up out of doors; when the attack is subsiding, a fortnight's holiday in a cool, bracing place will complete the cure, and reduce the chances of secondary complications to a minimum.

Lastly, one meets with cases, most commonly in hospital clinics but also in private practice, in which there would appear to be a generalised streptococcal infection both of the skin and mucous membranes. The patients are usually children in the first decade. On the skin are found impetiginous lesions, fissures at the muco-cutaneous junctions, intertrigo of the natural folds, and perionychia. There is a diffuse catarrh of the mucous membranes, stomatitis, rhinitis, nasopharyngitis with adenoidal and tonsillar hypertrophy, bronchitis, and "mucous colitis." A large proportion of these children have thread-worms, and, as a result of scratching, streptococcal infection of the perianal and vulval regions takes place. The underlying condition corresponds to that described by the late Dr. Eustace Smith as

"mucous disease." The chief causative factors are an excessive carbohydrate dietary and unhealthy surroundings. Local treatment alone is useless. The main indications are to keep the child as far as possible in fresh air and abundant sunlight (in winter artificial light baths are invaluable), to exclude soft starchy food and sweets rigidly from the diet, which should consist mainly of fresh meat, fish, eggs, green vegetables, fruit, milk, crisp toasted wholemeal bread-and-butter, and, for a while, to give rhubarb as a laxative and an alkaline bitter mixture before meals. Under this treatment the mucous membranes dry up, and the streptococcal infection of the skin gradually disappears.

I am, Sir, yours faithfully,

H. W. BARBER.

Devonshire-place, W., Dec. 28th, 1925.

INSULIN AND THE OPTICAL ACTIVITY OF URINE.

To the Editor of THE LANCET.

SIR,—Former observations have taught us that insulin causes transitory glycosuria in normally fed rabbits and in healthy people if its experimental application is suddenly stopped. This "paradoxical glycosuria" may become evident either at once or some time after the last application of insulin; it may persist for one or more days, and it may reach 1 per cent. and more. These experiments further have shown that it makes no difference if the insulin be injected or given by mouth. The insulin A.B. brand, insulin Tetewop, and insulin Fornet prove equally effective.

In the following experiments polarimetric examination of the urine showed the presence of optically active substances besides the glucose.

A rabbit of 2·5 kg., the urine of which had always been free from glucose and albumin, was injected with 9 units insulin A.B. brand. Six hours later the urine caused a deviation of the polarised light to the left of 2·5°. This polarisation to the left persisted for three days and varied from 0·05° to 0·4°. On the fourth day the polarimetric control of the urine showed a rotation of 0·3° to the right, after which the urine became normal again. Repeated experiments gave similar results.

A healthy man, 33 years, received on three successive days altogether 82 units insulin Tetewop in the form of pills made up with dried ox bile and powdered liquorice root. From the second day onwards the formerly absolutely normal urine began to influence the polarised light and caused a rotation that varied on the different days from 0·4° to the left to 0·6° to the right.

Another healthy individual also received insulin internally, with the difference, however, that the pills were not made up with Dutch insulin, but with insulin Fornet. Within four days 72 units were given, and the result was again that from the second day onwards the urine began to deviate the polarised light to the left (0·2°). On the fifth day the rotation reached 0·5° to the left and changed then on the seventh day into a rotation of 0·4° to the right.

These experiments and similar ones with identical results prove that the healthy and normal organism, on the experimental application of insulin, reacts by discharging in the urine an optically active substance that turns polarised light to the left. These observations suggested the idea that diabetic persons might react in the same way when treated with insulin.

Mrs. M. B., 56 years, 85 kg., middle case of diabetes; no glycosuria on a diet with no carbohydrates and 50 g. albumin. Twice a day injections, each of 20 units insulin A.B. brand; 50 g. of carbohydrate, and 75 g. albumin. From the second day onwards the urine turned polarised light to the left, varying from 0·5° to 1·5°. After reduction of the quantity of insulin to 10 units the urine became again optically inactive.

Mr. R. L., 53 years, 81 kg., slight case of diabetes, tolerance 40 g. carbohydrates. No glycosuria with three insulin pills Fornet, concentration III., three times a day; 100 g. carbohydrate, and 60 g. albumin. Towards the end of the first week the urine showed rotation of the polarised light to the left (1°). After reduction of the insulin doses to three pills concentration II. three times daily this symptom disappeared again.

These experiments and other similar ones show that not only the normal, but also the diabetic organism, when treated with an excess of insulin, discharges into the urine substances that turn the polarised light to the left. The origin and nature of these substances is to be discussed later. We want to draw attention to a hitherto unknown symptom that seems to indicate an overdosage of insulin and that might become useful for the routine control of diabetics under insulin treatment.

We are, Sir, yours faithfully,

F. W. FORNET,
E. CHRISTIENSEN.

Institute of Microbiology, Saarbruecken, Dec. 22nd, 1925.

FATIGUE AND INFECTION.

To the Editor of THE LANCET.

SIR,—Perhaps you will allow me to make a few comments on your leading article of Dec. 19th in relation to its bearing on the problem of influenza. The work of the late Dr. Spaeth and his collaborators has always interested me since it was first announced in 1922, because I thought, and still think, that it may have some bearing on the explanation of the pains and aches associated with a typical attack of influenza.

In an article which appeared six years ago,[1] I drew attention to some rather curious phenomena associated with an attack of influenza. This was elaborated in my M.D. thesis of 1920, published later.[2] I make this little historical note because in your leading article of July 22nd, 1922, on the Ætiology of Influenza, you state in regard to the investigations of Prof. J. McIntosh:

"A survey of all the facts at his disposal led the author of the report to the conclusion that the essential changes in influenza are due to the toxins of Pfeiffer's bacillus, which it produces whilst superficially placed in the respiratory passages, invasion of the tissues being no essential part of the disease."

In my article in the *Glasgow Medical Journal* I stated:

"It is suggested that a possible explanation of the main distinction between these two states is that the 'primary' is the stage where infection is external to the tissues of the body, being confined to the respiratory and possibly alimentary tracts, with little or no toxic absorption, and that the 'secondary' stage is the stage of toxæmia, possibly accompanied by invasion either into the lung tissue or into the general tissues of the body of the micro-organism or micro-organisms associated with the condition."

In a kindly annotation in your columns [3] my views were described as unorthodox, but so far as the belief that invasion of tissue plays no integral part in the attack, it would appear that this view is also held by Prof. McIntosh; but there we part company, for he explained the illness as due to a toxæmia. My clinical observations forbade the acceptance of a similar view for, being interested in the interpretation of symptoms, at the close of the epidemic I considered all the recognised symptoms recorded during the epidemic in relation to the history of each case, and stated:

"If the pains in the limbs and region of the back are caused through a toxæmia, either by producing symptoms of exhaustion or by the toxins producing irritation of the muscle sheaths, then I cannot understand why those pains should disappear with the onset of the 'secondary' stage. . . . Because those pains cannot at present be explained from a physiological standpoint, that should give no justification for more or less dismissing them as a proof of toxæmia." (This was written long before the publication of Prof. McIntosh's report, and is not a criticism of his view.)

In searching for an explanation of those symptoms I was impressed with the similarity of those aches and pains to those which occur in extreme physical labour, and I wondered if they could not be explained

[1] Brit. Med. Jour., 1919, ii., 519.
[2] Glasgow Medical Journal, October, 1922.
[3] THE LANCET, 1922, ii., 1083.

on the basis of some metabolic disturbance which was essentially protective in type, a disturbance most probably of the nature of a retention of a normal product of katabolism. The interest I felt in Dr. Spaeth's original communication will be appreciated. How far this new communication of Dr. Spaeth bears on those opinions I do not ask for space to discuss here, for at the present time the essential points are that fatigue under certain conditions appears to raise the bodily resistance to infection, and that in an attack of influenza there are symptoms simulating fatigue which appear to be of good prognostic significance.

This work may also throw new light on the infantile convulsion and the rigor of adult life. For many reasons it is to be hoped that the untimely end of Dr. Spaeth may not lead to an abandonment of investigations into the relationship of fatigue to infection. His work deserves all the prominence which has been given to it through your leading article. I am, Sir, yours faithfully,

Halifax, Dec. 23rd, 1925. A. GARVIE.

PROFESSIONAL CRITICISM OF THE GENERAL MEDICAL COUNCIL.

To the Editor of THE LANCET.

SIR,—In your issue of Dec. 26th Dr. Gordon Ward writes apparently with approval of an action on the part of medical men which would seem to me most reprehensible. I refer to his statement in regard to the signing of a "certificate which requires the doctor to certify that he has seen all the children of so-and-so alive on this date." I have long taught senior students and junior practitioners working under me that members of our profession are far too careless of the way in which they fill in certificates of all sorts, and warn them against signing their names in blank to any document or putting their signatures to any statement without first reading it carefully. The right to sign certain documents—such as applications for passports or for payment of pensions—is one which we share with justices of the peace and with members of a limited number of other professions. It is a right of which we should be proud, and carelessness in using our right should be avoided. This is, however, the first time that I have ever heard of a medical man openly stating that he is in the habit of signing such certificates knowing that he is making a false statement. Certainly I should call such behaviour both "fraudulent" and "unethical" (these are his actual words).

I am writing this because the layman who reads your paper should not be allowed to think that such a standpoint will go unchallenged. At any committee with disciplinary powers I, for one, should view with disfavour anyone who had made such a false statement by carelessness, and be prepared to recommend a severe penalty on anyone who was proved knowingly and intentionally to have done the same. I am, Sir, yours faithfully,

Welbeck-street, W., Dec. 26th, 1925. T. B. LAYTON.

To the Editor of THE LANCET.

SIR,—Will you allow me a word of friendly criticism of the leading article in your issue of Dec. 19th? In the course of that article you state that it is a British tradition that every trade and every profession is to manage its own affairs. Supposing I were a member of the black squad and, being democratic, I insisted on working for the wage offered by the employers, and that the other members of the trade-union did not agree to my doing so and forthwith proceeded to maul me. Am I not to be allowed to apply to the ordinary judicature of the country for reparation; is my case only to be considered by the trade-union? I do not agree to any such attitude whatsoever.

Now the General Medical Council as presently established is a law unto itself; in fact, if I read matters aright, it is superior even to the law of the land. It has a power which has not been held by any tribunal so far as I know since the Court of High Commission in the reign of James II. of England, that Court which directed the Bloody Assize in the West country. In some cases it appears to be very slack in its proceedings, in others unnecessarily severe. Many years ago a contribution which I made on the subject of seamen's eyesight, and which, with my consent, was published in the *Liverpool Journal of Commerce*, might even now get me into trouble. The General Medical Council may take it into its head even yet that such a contribution should not have been made to a lay journal. It was, however, an important contribution and stopped the adoption of certain regulations which would have put a very large number of competent men out of employment. Even at this moment I am anxious to make a communication on miners' nystagmus to an audience which would be composed chiefly of coal-pit managers and of the officials of the various unions. If the General Medical Council took it into its head it might say that that is an infamous thing to do. Naturally I believe that my communication will be of some value in helping to solve an extremely intricate economic problem. The General Medical Council is absolutely unconditioned; it may do what it likes, and nobody has any right to interfere with it. If THE LANCET thinks that that is a healthy state of matters I do not. I cannot go on with the publication meantime because one never knows what the General Medical Council will do.

It is all very well to say that a name can be reponed. So it can be, but meantime it has been struck off and the person involved has no doubt lost any appointments he may have held under the Crown, such as an appointment of certifying surgeon. He will likely also have lost any hospital appointment he may hold. As a rule, hospital appointments can only be held by persons who are on the Medical Register. When his name is reponed by the General Medical Council, will he also get back any medical appointments which he may have lost? Will they not meantime have been filled up so that it is impossible for him to regain his appointments? Unquestionably there should be an appeal to a competent legal tribunal before anyone is involved in perhaps financial ruin by amateur lawyers.

I have no wish whatever to disparage the General Medical Council. I think to some extent its constitution should be changed. But, given a right proportion of men who are of eminence in modern surgery and modern medicine, it is the proper body to determine the medical curriculum. To my mind it has recently made a mess of the curriculum. That, however, is a matter on which opinions may legitimately differ. But, given a sound working Council, whose members are for the most part in the prime of life and actively engaged in the higher parts of medical work, then it would be an admirable body for arranging the curriculum. The refusal to have an investigation rather conveys to my mind the idea that the cause of the General Medical Council is not a particularly strong one. Were it otherwise the Council would welcome a proper investigation.

My fear is that the discontent with the present organisation and powers of that body will cause its whole functions to be taken over by the Ministry of Health, and that is an event which I do not wish to occur. I think it can only be prevented by the General Medical Council insisting on an investigation and thereafter setting its house in order.

I am, Sir, yours faithfully,

Glasgow, Dec. 24th, 1925. FREELAND FERGUS.

*** The passage in our leading article, on which Dr. Fergus bases his argument, is not quoted quite correctly. The sentence ran: "Nor let it be forgotten that it is the British tradition to rely upon each trade or calling or service to maintain its own standards."—ED. L.

PROFESSIONAL SECRECY.

To the Editor of THE LANCET.

SIR,—Recently I was asked to see a man-servant by his employer for some trifling ailment, and in due course the man was placed on my insurance list and the medical record card sent to me. From this I learnt that, a couple of years ago, the man was certified as insane and removed to an asylum. On the principle of "doing unto others as ye would that they should do unto you," I thought that the employer should be made aware of this fact, but before telling him I took the advice of an eminent medico-legal expert, whose opinion was quite definite that it would be highly improper of me to divulge these facts to the employer.

The position of a general practitioner in such a case seems to me to be very doubtful; for, apart from professional rules, it seems clear that the head of a household is entitled to be informed of any facts relating to the inmates' health which may lead to undesirable consequences as, for example, in the case of infectious diseases or lunacy. I should be glad to learn whether the profession generally adopts the view of my medico-legal expert. I may add that this confidential medical record card passed through two health insurance offices without a cover.

I am, Sir, yours faithfully,

Dec. 27th, 1925. X. Y. Z.

Obituary.

JAMES RITCHIE, M.D., F.R.C.P. & S. EDIN.

BY the death of Dr. James Ritchie on Dec. 10th, in his eighty-fifth year, Edinburgh has lost one of the oldest and most respected members of the medical profession. Born in 1841, son of Andrew Ritchie, of Edinburgh, he was educated at the Royal High School and went on to study medicine at the Extra Mural School. He graduated M.B., C.M. Edin. with honours in 1872 and in the same year took the M.R.C.S. Eng. Two years later he became a Fellow of the Royal College of Surgeons of Edinburgh, and in due course a Member and Fellow of the Royal College of Physicians. Finally in 1891 he took the M.D. Edin. with a gold medal. This brilliant academic career was the forerunner of a very extensive practice in the town carried on up to recent years, when his retirement was deeply felt by many as the loss of a trusted friend and adviser. He held many appointments, chief among them the principal medical officership to the Scottish Metropolitan Assurance Company. At different times he was president of the Medico-Chirurgical and of the Obstetrical Societies of Edinburgh, and he was for many years examiner in midwifery to the R.C.S. Edin. His writings, which are to be found in the transactions of these societies, cover a large field of clinical observation. Dr. Ritchie was keenly interested in the affairs of the United Free Church of Scotland and held office for 62 years in posts filled by his father and grandfather before him. All his life he was a student of Nature and the leisure moments of a busy professional life were spent in gardening and sketching.

Dr. Ritchie married Jessie, daughter of Sir Thomas Clark, and is survived by two sons, both in the medical profession, and by four daughters.

HENRY DUNN WAUGH, M.D., B.Sc. LOND.

Dr. H. D. Waugh, who died in London on Christmas Day after a short illness, was born at Bathgate in Scotland, and entered the Normal School, Wigtown, in 1861. After spending six years there he came to London and received further education at King's College School and University College, at which he graduated both in Arts and Science. In 1882 he qualified from University College Hospital as M.R.C.S. Eng. and held an appointment at the Victoria Hospital for Children. Later in the same year he went to Brompton Hospital for Consumption, where he was successively house physician and resident medical officer. This latter post he held more than five years, in the course of which time the junior residents in the hospital who had been under his authority passed to positions on the staff, remaining his friends in the latter capacity, as they had been in the former. Many patients also in the recurring conditions which marked a good many of the cases returned to the hospital more than once, to find Waugh still in authority and making an ever kindly link between the past and present. There is no doubt that his long tenure of this important post enabled him to form and cement many abiding friendships. It was not until 1889 that he left the hospital, after taking his M.D. degree at London University, and entered general practice in the West End of London. Amongst his recreations was climbing, and he was a member of the Alpine Club.

JOHN GOUGH NOLAN, M.B., CH.B. MANCH.

Dr. Nolan, deputy police surgeon for Wigan, died suddenly at his residence in Wigan from a heart affection on Dec. 15th. A native of Southport, he received his early education at St. Edward's College, Liverpool. He studied at the University of Manchester and Dublin, qualifying M.R.C.S., L.R.C.P. Lond. in 1919, and in the same year graduated M.B., Ch.B. (with distinction in surgery) at the University of Manchester. He obtained the Dunville Surgical Scholarship, and before going to Wigan he was senior house physician and surgeon in the Royal Infirmary, Manchester, resident medical officer at the Northern Hospital for Women and Children, Manchester, and assistant medical officer at Barnes Convalescent Hospital, Cheadle, Cheshire. He was assistant honorary surgeon to the Wigan Rugby F.C. Dr. Nolan was in his thirty-second year and unmarried. At the inquest the coroner paid a high tribute to the work—public and private—which he had accomplished in Wigan before his life was prematurely cut short.

JOHN JAGGER PICKLES, M.R.C.S. ENG.

Dr. J. J. Pickles, sen., who died at his son's house at Leyburn on Dec. 21st, was born at Shelf, near Halifax, in 1851. He was educated at Hipperholme Grammar School and at Leeds Medical School, where he was gold medallist for his year. Qualifying as M.R.C.S. Eng. in 1873 and L.R.C.P. Edin. in 1874, he held resident appointments at the Leeds General Infirmary and at Bradford Infirmary. He became a general practitioner in the Camp Road district of Leeds, and remained at work there for 50 years. As a medical man he was a general favourite, and his relations with his professional brethren were unusually cordial. He was honorary surgeon to the Leeds Tradesmen Benevolent Society, and as an enthusiastic steward of the Medical Charitable Society for the West Riding of Yorkshire was always ready wisely to urge its claims on those who were eligible for election. His loyalty to the Leeds School of Medicine was shown by the fact that the five of his six sons who became doctors obtained their qualifications there. All his sons served in the war, and four survived. His wife died eight years ago. Dr. Pickles will be long remembered in medical circles in Leeds as a genial and straightforward colleague.

JOHN FRANCIS McCLEAN, M.R.C.S. ENG.

Dr. J. F. McClean, senior resident medical officer of the London Fever Hospital, died at St. Thomas's Hospital from septicæmia following an injury to his hand. He was educated at St. Thomas's Hospital and held the appointments of house surgeon and obstetric house physician there after qualifying M.R.C.S. Eng., L.R.C.P. Lond. in 1897. He became acting sanitary delegate of the British High Commission to Turkey and for many years was chief surgeon to the British Hospital in Constantinople. During the war he was interned by the Turks.

Parliamentary Intelligence.

NOTES ON CURRENT TOPICS.

The Christmas Recess.

PARLIAMENT was prorogued by Royal Commission in the House of Lords on Tuesday, Dec. 22nd, 1925. It will reassemble for the new session on Feb. 2nd next.

HOUSE OF COMMONS.

MONDAY, DEC. 21ST.

Illicit Cocaine Traffic in Bombay.

Colonel DAY asked the Under-Secretary of State for India whether there had been any prosecutions in Bombay for the three months ending Nov. 30th for the illicit sale of cocaine; and, if so, would he state the names of the defendants and the punishment inflicted on them if they were convicted.—Earl WINTERTON replied: Current reports of such cases are not officially received except of those arising from Customs seizures at the ports which are required for communication to the Secretariat of the League of Nations. Four cases under this head have occurred since August 31st, 1925, and led to convictions. I have seen reports in the press of the recent case in which three men appear to have been convicted and sentenced respectively to nine months' rigorous imprisonment and a fine of Rs.1000, to four months' rigorous imprisonment and a fine of Rs.500 or a further three months' imprisonment, and to three months' rigorous imprisonment and a fine of Rs.500 or three months' further imprisonment. The following is a statement regarding prosecutions arising from seizures of cocaine by the Customs authorities at Bombay, giving initials of accused, date of arrest, and sentence:—

T. O., August 31st, 1925, nine months' rigorous imprisonment.

R. M., Sept. 7th, 1925, fine of Rs.250, or three months' imprisonment (the fine was paid).

K. T., Sept. 16th, 1925, six months' rigorous imprisonment.

F. M., Sept. 28th, 1925, nine months' rigorous imprisonment, and fine of Rs.1000, or three months' rigorous imprisonment (the fine was paid).

Medical Services in East Africa.

Sir SYDNEY HENN asked the Secretary of State for the Colonies what steps were being taken to strengthen the medical services throughout East Africa; and what was the attitude towards recruitment in this country for such services adopted by medical schools and societies.—Mr. AMERY replied: It is not possible to give definite figures pending consideration of the estimates of the various Dependencies for the coming financial year, but I anticipate a considerable further extension of medical work in Eastern Africa in the near future, especially in Kenya, Uganda, and the Tanganyika Territory. It is hoped to increase the personnel of the East African Medical Service by some 20 or 30 officers during the next year. The attitude towards recruitment adopted by the medical schools and societies has been very helpful in the past, and I hope to secure their coöperation in filling up the many new appointments which are about to be created.

Native Infant Mortality in Tanganyika.

Sir SYDNEY HENN asked the Secretary of State for the Colonies whether his attention had been called to the rate of native infant mortality disclosed at the recent education conference at Dar-es-Salaam; and what steps were being taken, or would be taken, to deal with the matter.—Mr. AMERY replied: I am aware of the high rate of infant mortality in Tanganyika Territory. Active measures are being taken to improve medical and sanitary conditions. The number of medical officers has been increased by 12 this year and numerous native assistants, including sanitary inspectors and nurses, are being trained.

Poor-law Reform.

Mr. BRIANT asked the Prime Minister if, in view of the divergence of opinion on the proposals for Poor-law reform outlined by the Minister of Health and the opposition which had been evoked, notwithstanding the general desire for an alteration in the methods of relief of distress, he would consider the desirability of appointing a committee of Members of the House, representing all parties, in order to ascertain if it was possible to arrive at an agreed measure on the subject.—Mr. BALDWIN replied: My right hon. friend has adopted the plan of publishing his provisional proposals with the express object of obtaining suggestions from those experienced in local government and Poor-law administration, which will lead to a scheme commanding as large a measure of agreement as is possible in a matter of this kind. I do not think that such a committee as the hon. Member proposes is desirable at the present time.

Lunacy and Mental Disorder.

Mr. AMMON asked the Prime Minister what action he proposed to take with regard to the memorial sent to him in May last, signed by 90 Members of Parliament, with reference to the Royal Commission on Lunacy and Mental Disorder now sitting.—Mr. BALDWIN replied: On May 30th I wrote to my hon. friend the Member for Exeter (Sir R. Newman), who had forwarded this memorial to me, and informed him that the Royal Commission have a complete discretion regarding the procedure they adopt in the conduct of their inquiry, and that I am not, therefore, in a position to give any directions in the matter. At the same time, I informed my hon. friend of some of the considerations which had weighed with the Royal Commission in determining their procedure, and which appeared to me fully to justify the course which they have adopted in their inquiry.

Epileptic Patients at Maghull.

Mr. HAYES asked the Minister of Pensions whether any curative treatment other than four and a half hours' work daily was provided for the epileptic patients at the Ministry of Pensions Hospital, Maghull; whether he was aware that the patients were allowed group leave from 12.45 until 3.15 P.M.; that the midday meal was given before leave was taken; and that men taking leave in groups of three or more, in the event of one of the patients having a fit, the others must leave him or run the risk of being punished for being out over the leave hours; and whether, in the cases where men were fined 3*s.* to 6*s.* for being out after leave had expired, the deductions were stopped from the allowance paid to the wives.—Major TRYON replied: The treatment for epilepsy at this institution includes all the known curative and ameliorative methods. The four hours' leave granted is the maximum under the regulations which apply to all Ministry hospitals. It rests with the medical superintendent to determine at what time leave shall be taken in suitable cases. Where leave was overstayed in the circumstances referred to the medical superintendent would not regard the matter as one of misconduct. With regard to the last part of the question, any fine imposed for misconduct is, under the rules of the Ministry, payable from the personal allowance due to the man only, and not from any allowances payable to his wife and family.

Dental Benefit for Insured Persons.

Mr. WARNE asked the Minister of Health whether the Ministry recognised the specifications issued to approved societies by the Public Dental Service Association as suitable to enable a standard denture to be supplied to insured persons; in view of the varying kinds, qualities, and prices of materials to be used in the making of dentures, had the Ministry of Health introduced any scheme for ensuring dental treatment and dentures of a standard price and quality as in the case of medical benefit—e.g., chemicals, materials, and appliances supplied by the doctors, chemists, and druggists; and had the Ministry defined by statute, under Section 75 (5) of the National Health Insurance Act, 1924, dental treatment as being in the nature of medical benefit.—Mr. N. CHAMBERLAIN replied: The specifications in question which represent the results and negotiations between representatives of the dental profession and of certain approved societies do not require, and have not received, any recognition from my Department. As regards the second part of the question, I have no power under the existing Acts to make regulations on the lines suggested by the hon. Member. As regards the last part, I am advised that having regard to the terms in which this benefit is defined in the Acts, it is not a benefit in the nature of medical benefit for the purposes of Section 75 (5).

Medical Branches of the Services.

Major-General Sir FREDERICK SYKES asked the Prime Minister whether he would set up a committee to consider the present possibilities of reorganising the three medical services in the fighting forces into a unified service.—Mr. BALDWIN replied: The question of the amalgamation of the medical branches of the three fighting services was carefully considered by His Majesty's Government some two or three years ago, when it was decided that this step was undesirable. A Standing Joint Committee on which the Ministry of Pensions Medical Department is also represented has been set up to discuss matters affecting the medical services of the four departments. The question of the pay of officers of the medical branches of the three fighting services, and all matters ancillary thereto, is at present being considered by a committee set up for the purpose as indicated in the reply given on Nov. 16th.

Cost of Military Hospitals.

Major-General Sir FREDERICK SYKES asked the Secretary of State for War if he would state in respect of hospitals under his administration in this country and elsewhere,

respectively, the estimated capital value of lands and of buildings occupied; the annual building maintenance cost, the annual cost of medical stores, the annual cost of provisioning; the annual cost of, and the numbers of staff employed on, medical services; the annual cost of, and the numbers of staff employed on, services other than medical and building maintenance; the annual cost of any additional staff or services; the maximum patient accommodation; and the maximum and average number of patients in residence in any one day in the last 12 months.—Sir L. WORTHINGTON-EVANS replied: So far as they are available the figures are as follows:—

Estimated—	Home.		Abroad.
Capital value of lands and buildings	£1,000,000*	....	£500,000*
Annual building maintenance cost	£35,000	....	£17,500
Annual cost of medical stores	£24,000	....	£11,000
Annual cost of provisioning patients	£63,000	....	£38,000
Annual cost of staff	£375,000†	....	£198,000†
Numbers, ditto	1,800	....	950
Average daily number of equipped beds during year ended Nov. 30th, 1925	4,340	....	2,418
Maximum number of beds occupied during same period on any one day	3,717	....	1,877
Average, ditto	2,394	....	1,139

* These are very rough estimates and are given with reserve.
† The numbers and cost of those engaged on (*a*) medical and (*b*) other services, cannot be given separately. Personnel engaged on building maintenance are not included.

The hon. and gallant Member may like to refer to the very full information on pages 60 and 61 of the Army Accounts for 1923–1924.

Cost of Air Force Hospitals.

Major-General Sir FREDERICK SYKES asked a similar question with regard to Air Force hospitals.—Sir S. HOARE replied: The following statement gives the information requested by my hon. and gallant friend:—

	Home.		Abroad.
1. Capital cost of lands and buildings	£102,455	....	£700,000
2. Annual building maintenance cost	£3,000	....	£10,000
3. Annual cost of medical stores	£7,000	....	£9,000
4. Annual cost of provisions	£7,770	....	£24,000
5. Annual cost of staff employed on medical services	£49,000	....	£98,000
Numbers of such staff	239	....	337
6. Annual cost of staff employed on other than medical and building maintenance	£2,000	....	£14,000
7. Numbers of such staff	17	....	399
8. Annual cost of any additional staff or services	£6,000	....	£25,000
9. Maximum patient accommodation	447	....	900
10. Maximum number of patients in residence on any one day in last 12 months	437	....	544
11. Average number of patients in residence during last 12 months	199	....	329

As regards (1) above, £650,000 of the figure in the second column represents the capital cost of hospitals in Iraq, which were largely built under Army administration before the reduction of the garrison to its present size. A reassessment of the present value has not been undertaken. As regards (8) above, the figures of £6,000 and £25,000 represent cost of water, heating, lighting, and conservancy services. As regards (9), the 900 beds abroad do not include a possible expansion of 239 beds at Basrah Hospitals (British and Indian). The hospitals at Hinaidi are also capable of a very large expansion within the existing buildings. As regards (9), (10) and (11), the hospitals in Iraq cater for the whole of the garrisons—i.e., British and Indian Army troops—in addition to R.A.F. personnel; the same is the case in Palestine, where the hospitals also provide for the British Gendarmerie. Further, it should be borne in mind that the garrisons in Iraq and Palestine have been largely reduced in the past few years and are still in process of reduction.

Sealing of Milk Churns.

Mr. HERBERT WILLIAMS asked the Minister of Health whether he had received application from any local authority for power to order the sealing of milk churns containing milk in transit from producer to retailer; and, if so, what action was being taken by the department.—Sir KINGSLEY WOOD replied: My right hon. friend has received a number of communications suggesting that a Milk and Dairies Order should be made requiring the sealing of milk churns, and he is in consultation with the Minister of Agriculture and Fisheries in the matter.

Naval Medical Boards.

Mr. THOMAS WILLIAMS asked the First Lord of the Admiralty if he was aware that recently there were ten or more ex-naval officers and men inmates of the Meathop Sanatorium, some of them with 20 years' service; that a medical board took place which consisted of an examination by one doctor, and that the findings in each case were that the disability was constitutionally not caused by nor aggravated by service; and, in view of the loose term and the dissatisfaction among these ex-officers and men, would he cause inquiries to be made into some of these cases and remove any doubts that might exist.—Mr. DAVIDSON (Parliamentary Secretary to the Admiralty) replied: Naval cases of tuberculosis are invalided by Board of Survey at naval hospitals. In a very few instances, however, where the patient has already entered a sanatorium prior to coming under naval observation, it may be necessary to hold a survey with a view to invaliding without causing the patient to be moved. This survey may be carried out by the Admiralty surgeon and agent of the district in conjunction with the sanatorium authorities. The report of such survey would be examined by the Naval Medical Department at the Admiralty before action is taken, in a similar manner to that adopted for other naval medical surveys. I have no information as to the cases of tuberculosis in Meathop Sanatorium to which the hon. Member refers, but if the names of any special cases he may have in mind are furnished to me I will cause inquiry to be made.

TUESDAY, DEC. 22ND.

Notification of Diphtheria and Scarlet Fever.

Mr. BROMFIELD asked the Minister of Health whether he was aware that 31·5 per cent. of the cases notified as diphtheria, and 13·6 per cent of the cases notified as scarlet fever, and sent to the infectious diseases hospitals of the Metropolitan Asylums Board in the year 1924, were found after admission to be suffering from something else or from no disease at all; whether there was any reason to believe that these percentages were as great or greater throughout the country; whether any steps were taken to correct the statistics of notification for these errors; whether the parents of the children were informed as to the mistaken diagnoses; whether there was any information available as to how many, if any, of these cases contracted diphtheria or scarlet fever after admission to hospital; whether the practitioners who made these errors were called upon to refund the notification fees received by them; and, if not, would he consider the desirability of arranging for that course to be adopted.—Mr. N. CHAMBERLAIN replied: The answer to the first part of the question is in the affirmative, but I may say that I am informed that the increase in the number of cases of diphtheria admitted during 1924 to the infectious diseases hospitals of the Metropolitan Asylums Board in which the diagnosis had to be revised may be accounted for by the increasing recognition on the part of medical practitioners of the necessity, in the interests of the patient, of immediate removal to hospital for the purpose of receiving treatment as early as possible without waiting for the receipt of a laboratory report. As regards the second part of the question, no figures are available for the country as a whole which would enable any definite conclusion to be arrived at. As regards the third part, I am informed that in cases in which the diagnosis made at the Metropolitan Asylums Board's hospitals is not in agreement with that of the notifying practitioner, the information is communicated to the medical officer of health of the sanitary district from which the patient was removed in order to ensure the accuracy of his statistics. As regards the fourth part, I understand that information as to the diagnosis made at the hospital is given to the parents on request. As regards the fifth part, I am informed that there is no information available as to the number, if any, of these cases which contract scarlet fever or diphtheria after admission to hospital. As regards the last part of the question, I am advised that there is no statutory provision under which a medical practitioner could be called upon to refund the fee for a notification certificate in a case in which his diagnosis is not in agreement with that subsequently made at the hospital, and in view of what I have said in replying to the first part of the question, it would, in my opinion, be undesirable in the public interest that such a course should be adopted.

Deaths from Encephalitis Lethargica.

Captain FAIRFAX asked the Minister of Health, in view of the figures given by his department, which show 339 deaths from encephalitis lethargica in 1922, 531 in 1923, and 1407 in 1924, what the figures were for 1925 up to date; and whether any measures had been taken, or were in contemplation, to prevent the increase of this fatal complaint.—Sir K. WOOD (Parliamentary Secretary to the Ministry of Health) replied: 1157 deaths have been provisionally attributed to this disease in England and Wales during 1925, up to the end of October. As regards the second part of the question, my right hon. friend's department has issued several reports and memoranda in recent

years in which the principal facts ascertained regarding the occurrence of this disease and the manner of its spread have been set out. Efforts are being made in conjunction with the Medical Research Council to add to our knowledge of the causes of this disease and the possibilities of avoiding it.

Medical News.

UNIVERSITY OF OXFORD.—The Board of Faculty of Medicine has coöpted E. Farquhar Buzzard, D.M., Magdalen College, and Malcolm H. MacKeith, D.M., Fellow of Magdalen College, as members of the Board for two years. The Francis Gotch Memorial Prize in Physiology for 1925 has been awarded to Joyce Wright, B.A., Somerville College. Proxime accessit: Jack Wynne Pugh, B.A., University College.

UNIVERSITY OF CAMBRIDGE.—At recent examinations the following candidates were successful:—

THIRD EXAMINATION FOR MEDICAL AND SURGICAL DEGREES.

Part I., Surgery, Midwifery, and Gynæcology.—A. R. Adderley, D. Aserman, G. W. Bamber, J. O. W. Bland, G. C. W. Brown, J. A. S. Brown, P. R. Buckton, G. P. Chandler, P. F. Chandler, H. A. Clegg, L. C. Cook, W. F. Cooper, R. Cunningham, T. S. Dewey, H. V. Dicks, J. Dockray, C. E. Donaldson, A. B. Eddowes, J. B. Ellison, A. W. Ewing, T. D. W. Fryer, S. J. P. Gray, J. C. P. Grey, W. S. Grove, H. J. Heathcote, J. D. Hindley-Smith, G. G. Holmes, J. H. Humphris, I. A. Jackson, D. McI. Johnson, S. Levy Simpson, A. V. Mackenzie, Hon. W. S. Maclay, R. D. Milford, H. L. Milles, W. J. Moody, R. T. Mummery, H. P. Nelson, H. E. Nourse, F. B. Parsons, W. R. H. Pooler, J. D. Procter, L. A. Richardson, R. Riley, J. B. W. Roberton, M. E. D. Roberts, F. C. Roles, G. L. F. Rowell, H. Scudamore, C. J. L. Sharp, G. Simon, R. E. Smith, A. W. Spence, G. M. Tanner, B. C. Tate, G. K. Taylor, H. B. Trumper, J. G. Wigley, H. L. Wilson, R. M. Windeyer, F. G. Winterton, A. T. Worthington, and H. R. Youngman.

Part II., Physic, Pathology, and Pharmacology.—D. Aserman, G. W. Bamber, W. A. Barnes, I. C. P. Beauchamp, J. A. S. Brown, Hon. C. B. Buckley, N. F. C. Burgess, R. T. Chadwick, H. A. Clegg, A. C. Copley, R. W. Cuningham, G. H. Day, G. W. S. de Jersey, J. H. Gibbens, N. T. Glynn, R. F. Guymer, C. C. Halliwell, J. C. Hogg, A. T. Howell, W. S. Hunt, J. W. W. Jepps, D. F. Lawson, G. A. Q. Lennane, L. J. Panting, W. R. H. Pooler, R. L. Rhodes, F. R. Sandford, E. M. Shackel, A. Simpson-Smith, H. B. Stallard, E. J. E. Topham, E. A. Trim, J. L. Warner, and H. M. Woodman.

UNIVERSITY OF LONDON.—At the recent examination for the degree of Master of Surgery John Basil Hume, of St. Bartholomew's Hospital, was approved by the examiners.

UNIVERSITY OF DURHAM.—At the Convocation held on Dec. 19th the following degrees and diplomas were conferred:—

MASTER OF SURGERY.

James Whillis and Angus H. Whyte.

BACHELOR OF MEDICINE AND BACHELOR OF SURGERY.

Norman Davison, James W. Dickinson, Basil A. Dormer, Alan Gray, Louis Lavine, Richard A. Pallister, Ernest P. Pratt, Winifred M. Proctor, William S. Walton, and James Y. Woodhouse.

BACHELOR OF HYGIENE.

Ian M. McLachlan.

DIPLOMA IN PUBLIC HEALTH.

Ian M. McLachlan.

UNIVERSITY OF LIVERPOOL.—At examinations held recently the following candidates were successful:—

DEGREE OF M.D.

F. S. Fowweather, W. D. Jeans, R. J. Minnitt, M. Newman, and C. Voigt.

DEGREES OF M.B. AND CH.B. (HONOURS).

Class I.—C. A. Birch (distinction in Medicine and Obstetrics).

FINAL EXAMINATION FOR DEGREES OF M.B., CH.B.

Part III.—A. Ashworth, Ethel Barrow, C. Baxter, E. I. Bieber, P. V. Dillon, F. R. Faux, J. H. Gilchrist, R. I. Greenshields, J. Hatton, Enid M. Hughes, T. S. L. Jones, Rebecca Katz, B. Kay (distinction in Obstetrics), Alice M. Luck, D. D. O. McLoughlin, Lilian W. Massey, J. Morrissey, E. R. S. Owen, W. J. Pierce, Thirza Redman, D. Roberts, F. B. Shevlin, P. Strelitz, J. Tarshish, J. E. C. Walker, and W. L. Webb.

Part I.—A. B. Anderson, J. H. Boultbee, W. S. Brindle (with distinction), A. N. Cameron, J. K. Cameron, E. Cohen, W. S. Creer, A. Dodd, W. J. Eastwood, K. Edmundson, Elsie A. Griffiths, I. Gurland, E. D. Irvine, R. N. Johnson, O. V. Jones, Theresa J. Lee, J. L. Lewis, F. E. Lomas, J. McHugh, S. G. Massey-Lynch, J. W. Pickup, A. D. Polonsky, C. Rigby, N. W. Riley, G. L. Roberts, Alfreda H. Slater, V. J. M. Taylor, J. P. Thomas, S. L. Tunnicliffe, D. P. de Villiers, E. N. Wardle (with distinction), P. H. Whitaker, and R. L. Wynne.

Part II.—Grace A. Austin, W. A. Davies, J. Halton, W. E. Hargreaves, S. P. Meadows (distinction in Forensic Medicine), J. Morgan, J. N. Parrington, E. S. Smith, and Joan Watkins.

SECOND EXAMINATION FOR DEGREES OF M.B., CH.B.

Part A.—S. Alstead, E. T. Bates, *R. K. Bowes, S. Canter, J. H. St. B. Crosby, *T. B. Davie, Ariel R. S. Deacon, †T. L. Dowell, R. Doyle, H. R. Dugdale, J. H. Follows, R. A. Furniss, Agnes G. Gillespie, R. G. Gornall, J. J. Graham, G. T. Harris, E. W. Jones, Mary G. Jones, W. E. J. Jones, †T. Lasker, N. R. Lawrie, J. M. Leggate, H. Leiper, C. T. Mercer, Doris Morrison, H. Paterson, Elizabeth B. Robson, E. L. Rubin, †M. Silverstone, H. W. Smith, G. A. Talwrn-Jones, G. G. Warburton, and F. J. Welton.

* Distinction in Anatomy and Physiology. † Distinction in Physiology.

Part B.—S. W. Adler, Gladys A. Coventry, A. Dala, R. E. Jackson, K. Jilani, I. Kossew, T. C. Newman, G. W. Phillips, E. E. Prebble, and A. L. Williams.

DIPLOMA IN TROPICAL MEDICINE.

A. R. D. Adams, F. R. Ashton, Esther Ashworth, C. W. Bamford, J. Beinashowitz, G. Clark, B. A. Coghlan, Ivy Collier, P. G. Cumming, M. Fisher, M. S. Grutu, A. J. Hawe, Z. H. Jafri, Elvy I. Johnstone, J. R. Kerr, D. M. Mackay, M. M. el Makkawi, L. G. Maldonado, S. F. Mar, B. P. Mozoomdar, D. A. Skan, E. R. Stone, C. G. Terrell, and F. Tooth.

Recommended for Milne medals: Dr. Adams and Dr. Hawe.

UNIVERSITY OF BIRMINGHAM.—At a Congregation held recently the following degrees were conferred:—

Doctor of Medicine.—Mabel Thorburn Johnstone, Horace Simkin Savage.

Bachelor of Medicine and Bachelor of Surgery.—Dennis Murray Bladon, Zaki Ahmed Goma, Constance Rougier La Trobe, Margaret Elizabeth Lovett, Dorothy May Payton.

UNIVERSITY OF DUBLIN, TRINITY COLLEGE.—It is proposed to celebrate the centenary of the new medical school early in January. The building of the new school was begun in 1823 and it was formally opened on Nov. 1st, 1825, by Prof. James Macartney, university professor of anatomy and chirurgery. On Wednesday, Jan. 13th, Dr. T. P. C. Kirkpatrick will deliver an address on the Early History of the School of Physic at a meeting to be held in the school, at which the Provost will preside. All medical graduates of the University are invited to be present. On the same evening a dinner will be held in the dining hall of the College at 7.45 P.M., for which medical graduates may obtain tickets at £1 1*s.* each. Academic dress will be worn. Accommodation is limited and applications for dinner tickets should be made as early as possible to the Dean of the Faculty of Physic, Trinity College, Dublin.

TERRITORIAL ARMY MEDICAL OFFICERS ASSOCIATION.—A dinner for Territorial medical officers, active and retired, will take place at the Café Royal, 68, Regent-street, London, W., on Friday, Feb. 12th, at 8 P.M. Officers proposing to attend are requested to communicate without delay with Colonel M. B. Ray, D.S.O., M.D., at 37, Russell-square, London, W.C.1. Lieut.-General Sir Hugh Jeudwine and Lieut.-General Sir William Leishman have intimated their intention to be present.

LECTURERS TO MIDWIVES.—Post-certificate lectures arranged by the London County Council for 1926 are to be given in Northern London by Mr. T. W. Letchworth, Dr. Eric Pritchard, Dr. Janet Lane-Claypon, Mr. Alfred Richardson, Dr. T. Anwyl-Davies, Mr. J. M. Wyatt, and Dr. G. F. Stebbing, and in Southern London by Dr. W. Brander, Mr. Trevor Davies, Mr. Leonard Phillips, Mr. Leslie Williams, Mr. M. S. Mayou, Dr. Remington Hobbs, and Dr. Archibald Gray.

ROYAL INSTITUTE OF PUBLIC HEALTH.—The Council have awarded the Harben Gold Medal for 1925 (triennial), of the value of 50 guineas, to Prof. Baron Shibasaburo Kitasato, M.D., Director of the Royal Japanese Institute for Infectious Diseases, for his "eminent services to the public health." The Council have also made the Smith Award to Prof. Matthew Hay, M.D., LL.D., F.R.C.P. Irel., for his "outstanding merit as a medical officer of health." The Smith Award takes the form of a bronze statuette of Hygeia by Charles L. Hartwell, R.A., which was exhibited at the Royal Academy in 1919.

BRITISH INSTITUTE OF PHILOSOPHICAL STUDIES.—A course of nine lectures on Life and Mind will be given by Prof. James Johnstone on Mondays at 5.30 P.M. at the Bedford College for Women, Regent's Park, N.W. The course will begin on Jan. 11th, and the fee will be £1 5*s.* Twenty lectures on Science and Philosophy—the Conception of Matter—will be given by Prof. Leonard J. Russell on Tuesdays at 5.30 P.M. from Jan. 12th onwards at the same place. The fee for this course will be £2 2*s.*, and in both cases members of the Institute will be charged half fees only. A full syllabus can be obtained from the Director, 88, Kingsway, London, W.C. 2.

BRITISH INDUSTRIES FAIR.—This fair will open concurrently in London and Birmingham in February next, and will include exhibits of chemicals and a variety of machinery and manufactures.

PHARMACEUTICAL SOCIETY.—The third evening meeting of the session will be held in the lecture theatre of the Society's House on Tuesday, Jan. 12th, at 8 o'clock, when Frank Browne, F.I.C., and Dorothy G. Randle will read a paper on Some New, Modified, and Tested Formulæ of the British Pharmaceutical Codex.

WELSH HOSPITALS DINNER.—A reunion dinner for all ranks will be held at the Royal Hotel, Cardiff, on the evening of Jan. 16th. Colonel A. W. Sheen will preside, and owing to the international match at Cardiff on that date a large attendance is expected. Tickets and further particulars can be obtained from Staff-Sergeant R. W. Hedley, Waterworks Department, City Hall, Cardiff.

FROM next Monday, Jan. 4th, all persons who are required to be insured under the National Health Insurance Act must also be insured under the Widows', Orphans' and Old Age Contributory Pensions Act. Health and pensions contributions will be paid on one card by means of combined health and pensions stamps which can be purchased from any post office.

RONTGEN SOCIETY.—A general meeting will be held on Jan. 5th, at 8.15 P.M., in the British Institute of Radiology, 32, Welbeck-street, London, W. Dr. G. W. C. Kaye will read a paper on a Combined X Ray Tube and Vacuum Pump Unit, and one on the Industrial Uses of X Rays. Mr. A. F. Dufton will speak on the Measurement of Radium during Radioactive Growth.

WIRELESS AT ST BARTHOLOMEW'S HOSPITAL.—A wireless installation, presented by the Radio Communication Co. through the *Daily News* fund, was inaugurated at St. Bartholomew's Hospital last week. The 642 head 'phones which, in addition to two loud speakers, comprise the reception equipment, were given by the British Thomson-Houston Co.

ROYAL SALOP INFIRMARY.—The Marchioness of Cambridge has laid the foundation-stone of a new children's wing of the Royal Salop Infirmary at Shrewsbury which will cost £20,000. The extension will provide 30 beds immediately and 40 others later on.

THE "DAILY MAIL" HOSPITAL BALLOT.—Lord Knutsford, presiding at the annual meeting of the British Charities Association, said that the surplus on the *Daily Mail* Hospital Ballot amounted to over £87,000, the highest result of any project conducted under the auspices of the Association. Last year the Association allocated £15,000 to the London Hospital; this year the amount has been £20,000.

NATIONAL HOSPITAL FOR DISEASES OF THE HEART.—Special intensive courses in cardiology, of a fortnight's duration, are held at this hospital in January, July, and October every year; the first of these courses for the year 1926 will begin on Monday, Jan. 18th. The fee for the course, which is strictly limited to 16 members, will be £7 7*s*. A copy of the syllabus and full particulars may be obtained from the Secretary at the hospital, Westmoreland-street, London, W. 1.

DENTAL BOARD OF THE UNITED KINGDOM.—The fourth and last of the series of post-graduate lectures, illustrated by lantern slides, on General Anæsthesia, arranged by this Board will be delivered by Prof. Noel Paton, F.R.S., on the Metabolic Changes in Chloroform Poisoning, at the following places: In London, at the house of the Royal Society of Medicine, 1, Wimpole-street, W., at 8.30 P.M., on Jan. 11th; in Manchester, at the Medical School, University Buildings, Oxford-road, at 5.30 P.M., on Jan. 13th; and in Edinburgh, in the Surgery Theatre of the University, at 5 P.M., on Jan. 15th. The course is intended primarily for dentists and medical practitioners. Dental students are invited to attend. Tickets of admission are not required. It is the intention of the Board to publish these lectures in volume form early this year.

Messrs. J. and A. Churchill announce that they are publishing this week a new work entitled "The Nematode Parasites of Vertebrates," by Dr. Warrington Yorke, professor of parasitology, University of Liverpool, and the Liverpool School of Tropical Medicine, and Dr. P. A. Maplestone, lecturer in the same school. About 900 figures will illustrate the work, and the object of the authors has been to provide a reliable guide to the allocation of parasites to their genera. A fourth edition of Prof. E. H. Starling's "Principles of Human Physiology" is also to be issued. It has been thoroughly revised and now contains 570 illustrations, 10 of which are in colour. "Recent Advances in Obstetrics and Gynæcology," by Mr. Aleck W. Bourne, obstetric surgeon, St. Mary's Hospital, is now ready.

Mr. Lionel de Rothschild has become President of the Hospital for Diseases of the Throat, Golden-square.

COVENTRY HOSPITAL SATURDAY FUND.—The Hospital Saturday collection in Coventry this year produced £22,625, and a hospital carnival yielded £3466 in addition.

LONG WAITING LISTS.—At the annual meeting of the Edinburgh Royal Infirmary Samaritan Society it was stated that on Dec. 1st last there were 2229 persons on the waiting list of the infirmary, and that two deaths had occurred on account of the delay in admission. At the Leeds Infirmary there is a waiting list of 1700.

METROPOLITAN HOSPITAL SUNDAY FUND.—At a meeting of the Metropolitan Hospital Sunday Fund, held recently at the London Mansion House under the presidency of the Lord Mayor, Sir William Pryke, June 27th was fixed as the date on which the annual collection will take place this year. The sum collected on Hospital Sunday in 1925 was £94,841, the fourth highest on record. £84,620 were distributed among 227 institutions. Of the total collections 10 per cent. was appropriated to nursing homes and the purchase of surgical appliances.

INSTITUTE OF PSYCHO-ANALYSIS.—The following courses of lectures will be given to medical practitioners and medical students at the Examination Hall, Queen-square, W.C., on Friday evenings at 8.30 P.M., starting on Jan. 15th. The first three lectures on the Unconscious will be given by Mr. J. C. Flügel. Dr. Ernest Jones will then give six lectures on the Theory of Sexuality, to be followed by six lectures by Dr. James Glover on the Psycho-pathology of Anxiety States, Phobias, and Obsessions. Further particulars can be obtained from Dr. John Rickman, 26, Devonshire-place, W. 1.

CENTRAL ASSOCIATION FOR MENTAL WELFARE.—A course of eight medical lectures on Mental Disorders and their Early Treatment will be given in the Lecture Hall of the Six Point Group, 92, Victoria-street, S.W., on Wednesdays, at 5.30 P.M., beginning on Jan. 6th. The lectures are intended especially for social workers interested in mental welfare. Dr. T. Beaton will deliver the first lecture, entitled the Nature of Mental Disorder and its Relation to Insanity, and the two following ones on Psychology. Dr. E. Mapother will give two lectures on Clinical Types of Mental Disorder and one on Methods of Treatment of Mental Disorders. The final lectures of the course, on Delinquency in Children and Methods of Investigation, will be given by Dr. E. A. Hamilton Pearson. Further particulars may be obtained from the Hon. Secretary of the Association at 24, Buckingham Palace-road, London, S.W. 1.

DONATIONS AND BEQUESTS.—Mrs. Mary Anne Traill, formerly of Brighton, bequeathed £500 to the Royal Sailors' Rest, Portsmouth; £300 to John Groom's Crippleage and Flower Girls' Mission; £200 each to St. Dunstan's Hostel for the Blind, the Cripples' Home for Girls, Marylebone-road, the East London Hospital for Children, the Royal Surgical Aid Society, and the Boy Scouts' Fund; and £100 each to the Hospital for Women, Soho, the Royal Ophthalmic Society, City-road, and St. Mark's Hospital, City-road.—An appeal by the Mayor of Birkenhead on behalf of the local hospitals has reached £1500. In addition a collection made at Cammell Lairds yards on the occasion of the launch of H.M.S. *Rodney* amounted to £310.—The late Mr. T. R. Bolitho left by will, in addition to other bequests, £200 to the West Cornwall Infirmary; £100 each to the Liskeard Cottage Hospital; the Edward Main Hospital, St. Ives; the Miners' Hospital, Redruth; the Helston Dispensary; the Royal Cornwall Sailors' Home and Infirmary, Falmouth; the Royal Cornwall Infirmary, Truro; the Penzance branch of the Charity Organisation Society, and the Penzance Rescue and Preventive Society.—Mr. Hugh Shearwin Hemsley, of Hornsea, formerly of Headingley, Leeds, among other bequests, gave £3000 to the Wesleyan Methodist Foreign Missionary Society, as to £1250 thereof to be for medical missions connected therewith; £2000 to the Leeds General Infirmary to endow two beds; £1000 each to the Cockeridge Convalescent Hospital, and to the National Children's Home and Orphanage (Dr. Stephenson's).—The following legacies and donations have been received by St. Mary's Hospitals, Manchester: Women's Guild of Service, £2500; the executors of the late Mr. J. D. Mitchell, £214; of the late Miss R. Hibbert, £186; of the late Selina Greaves, £100; and of Dickanson's Charity, £78.—The subscriptions to the Manchester Cancer Research Fund now stand at £8052, the latest donations being £250 from the Fine Cotton Spinners, and £100 from the Amalgamated Association of Operative Cotton Spinners and Twiners.—Mr. Frank Lloyd, of Sittingbourne Paper Mills, has given a donation of £10,000 to St. Bartholomew's Hospital, Rochester, Extension Fund.

Medical Diary.

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

SOCIETIES.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

Wednesday, Jan. 6th.

SURGERY: at 8.30 P.M.
Discussion:
The Surgical Treatment of Duodenal Ulcer. Opener: Mr. C. A. Pannett.

Thursday, Jan. 7th.

OBSTETRICS AND GYNÆCOLOGY: at 8 P.M.
Specimens:
The President (Mr. T. G. Stevens): (1) Carneous Mole retained Eighteen Months in Utero. (2) Two Unusual Cases of Ovarian Tumours.
Short Communication:
Dr. G. E. Gibberd: A Case of Obstructed Labour due to Conjointed Twins.
Paper:
Dr. Wilfred Shaw: Krukenberg Tumours of the Ovaries.

Friday, Jan. 8th.

CLINICAL: at 5.30 P.M. (Cases at 5 P.M.)
Cases:
Dr. Douglas Firth: Patent Ductus Arteriosus.
Dr. W. A. Milligan: Lymphangioma.
Dr. Bernard Myers: (1) Hysterical Dysphagia in a Child. (2) Tuberculous Peritonitis in a Child.
Dr. L. S. T. Burrell: Angio-neurotic Œdema.
Mr. R. Maingot: Carcinoma of Thyroid.
Other cases will be shown.

OPHTHALMOLOGY } at 8.30 P.M. (Cases at 8 P.M.)
LARYNGOLOGY }
Cases:
Mr. B. T. Lang: (1) Ruptured Optic Nerve. (2) Pigmented Mole of Iris.
Other cases will be shown.
Discussion:
Optic Neuritis in its Relation to Sinusitis.
Speakers:
Mr. E. D. D. Davis, Dr. Logan Turner, Mr. Stephen Mayou, and Mr. Foster Moore.
A selection of specimens from the Onodi Collection will be on view on Thursday afternoon, Jan. 7th, and on Friday, Jan. 8th.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.
MONDAY, Jan. 4th, to SATURDAY, Jan. 9th.—WEST END HOSPITAL FOR NERVOUS DISEASES, 73, Welbeck-street, at 5 P.M. Special course on Nervous Diseases. Mon., Dr. Carnegie Dickson: The Pathology of the Cerebro-Spinal Fluid. Tues., Dr. Hildred Carlill: The Reflexes in Health and Disease. Wed., Mr. Lindsay Rea: Methods of Examining the Eye in Diseases of the Nervous System. Thurs., Mr. Laming Evans: Orthopedic Aspects of Nervous Disease. Fri., Sir James Dundas-Grant: The Auditory Apparatus in Nervous Disease. It should be noted that the first demonstration only takes place at the In-patient Department, Gloucester-gate, Regent's Park.—BETHLEM ROYAL HOSPITAL, S.E. Lecture-demonstrations in Psychological Medicine at 11 A.M. Tues., Dr. Porter Phillips: The Diagnosis and Symptomatology of Mental Diseases Sat., Dr. Thomas Beaton: Psycho-neuroses.

ST. MARY'S HOSPITALS, MANCHESTER, POST-GRADUATE LECTURES.
FRIDAY, Jan. 8th (at Whitworth-street West Branch). 4.30 P.M., Dr. W. E. Fothergill: The Development of Vaginal Operations for Genital Prolapse.

Appointments.

Hampstead General and North-West London Hospital: BROOK, C. D. S., M.B., D.P.H. Lond., House Surgeon; ELMITT, MARY H., M.B., B.S.Lond., Casualty Surgical Officer.

Liverpool and District Hospital for Diseases of the Heart: BEATTIE, Prof. J. M., M.D. Edin., Hon. Consulting Bacteriologist; CRAWFORD, A. C., M.B. Liverp., D.T.M., D.P.H., Hon. Assistant Physician; EVANS, W. HOWEL, M.B. Liverp., Hon. Pathologist; FENN, A. W. B., L.D.S., Hon. Dental Surgeon; FORDYCE, A. D., M.D., F.R.C.P. Edin., Hon. Physician, Children's Department; HARRIS, I., M.D. Konig., L.R.C.P., Hon. Physician; JONES, T. C. L., F.R.C.S. Eng., Hon. Consulting Surgeon; LEATHART, P. W., B.Ch. Camb., Hon. Laryngologist; ORAM, W. C., M.D.Dub., D.P.H., Hon. Radiographer; ROBINSON, A. L., M.D.Lond., F.R.C.S.Eng., Hon. Consulting Gynæcologist.

London Lock Hospital: PHILLIPS, S., M.D., F.R.C.P. Lond., Hon Consulting Physician; LANE, J. E., F.R.C.S. Eng., Hon. Consulting Surgeon.

Vacancies.

For further information refer to the advertisement columns.

Ascot, Heatherwood Hospital.—Res. Asst. M.O. £300.
Barrow-in-Furness County Borough.—Asst. M.O.H. and Asst. Tub. O. £600.
Bedford County Hospital.—Asst. H.S. At rate of £130.
Belfast Joint Nursing and Midwives Council, Northern Ireland.—Examiners.
Birmingham General Hospital.—Med. Reg. and Res. M.O. £155.
Birmingham and Midland Eye Hospital.—Res. Surg. O. £150.
Canterbury, Kent and Canterbury Hospital.—Third Res. M.O. £125.
County of London Mental Hospital.—Eighth Asst. M.O. £300.
Derbyshire Royal Infirmary, Derby.—Ophth. H.S. £200.
East Sussex County Mental Hospital, Hellingly, Sussex.—Pathologist. £500.
Gordon Hospital, Vauxhall Bridge-road, S.W.—Anæsthetist. £21.
Hatton, Warwick County Mental Hospital.—Jun. Asst. M.O. £250.
Hospital for Consumption and Diseases of the Chest, Brompton, S.W.—H.P. £60.
Keighley, Victoria Hospital.—Res. M.O. At rate of £180.
Kent Education Committee, School Medical Service.—Dentist. £500.
Lenham Sanatorium.—Asst. M.O. £400.
London Fever Hospital, Islington, N.—Sen. Res. M.O. £500.
London Lock Hospital, 283, Harrow-road, W., and 91, Dean-street, W.—Hon. P. Also Hon. Surg. to Out-Patients.
Macclesfield General Infirmary.—Second H.S. £150.
Maidstone, West Kent General Hospital.—H.S. At rate of £220.
Manchester City Education Committee.—Asst. Sch. M.O. £600.
Manchester Hospital for Consumption, &c.—Res. M.O. £200.
Metropolitan Asylums Board Infectious Hospitals Service.—Med. Supt. £900.
Middlesex Hospital, Mortimer-street, W.—Two Asst. Radiologists. £100.
Plymouth, Didworthy Sanatorium, South Brent.—Res. M.O. £600.
Royal Free Hospital, Gray's Inn-road, W.C.—Second H.P.
Sheffield, South Yorkshire Mental Hospital.—M.O. £400.
Singapore College of Medicine, Straits Settlements.—Prof. of Bio-Chemistry and Prof. of Biology. Each $850–$1000.
Southport Convalescent Hospital and Sea-Bathing Infirmary.—Res. Med. Supt. £600.
Sudan Medical Service.—Four M.O.'s. £E.720.
University of London, South Kensington, S.W.—University Professor of Obstet. Medicine &c. £200.
Victoria Hospital for Children, Tite-street, Chelsea, S.W.—H.P. and H.S. Each at rate of £100.
West London Hospital, Hammersmith-road, W.—Hon. Obstet. Reg.
Wolverhampton and Staffordshire Hospital.—Res. Surg. O. £250.

The Chief Inspector of Factories, Home Office, London, S.W., announces the following vacant appointments for Certifying Factory Surgeons: Tunbridge Wells, Kent; Dover, Kent; Loftus, Yorks, N. Riding.

Births, Marriages, and Deaths.

BIRTHS.

ELPHICK.—On Dec. 20th, at the General Lying-in Hospital, Lambeth, the wife of Cyril Henry Elphick, L.D.S., of a son.
GRAY.—On Dec. 22nd, at Westerhall, Weymouth, the wife of Adam Gray, M.D., of a daughter (who only survived 48 hours).
KEYS.—On Dec. 17th, at Ravello, Ruislip, the wife of Sydney Hudson Keys, L.R.C.P. Lond., M.R.C.S. Eng., of a daughter.
REID.—On Dec. 24th, at Burntwood, Lichfield, Staffs, the wife of Dr. William Reid, of a son.
WOTHERSPOON.—On Christmas Eve, at Lewisham High-road, St. John's, S.E., the wife of Dr. John Wotherspoon, of a son.

MARRIAGES.

POWELL—MCCULLAGH.—On Dec. 23rd, at University-road Methodist Church, Belfast, Abraham Thomas Watkin Powell, *M.C.*, M.B., D.P.H., of Bury St. Edmunds, to Dorothy Mary McCullagh, L.R.C.P. Edin., L.D.S.

DEATHS.

LLOYD-OWEN.—On Christmas night, suddenly, after a short illness, at Bron-y-Craig, Harlech, David Charles Lloyd-Owen, F.R.C.S., J.P., Warwickshire, aged 82.
MACLEAN.—On Dec. 25th, at Penlee-gardens, Stoke, Plymouth, John Cassilis Birkmyre Maclean, Surg. Rear-Admiral (retd.).
NETTLE.—On Dec. 23rd, at Parade House, Liskeard, William Nettle, M.R.C.S., L.S.A., V.D., J.P.
STEPHENSON.—On Dec. 21st, at Queen Mary's Hospital, Roehampton, Major John Stephenson, *M.C.*, late R.A.M.C.
STIRLING.—On Dec. 27th, at Grange-road, S.E., Charles Stirling, M.B., C.M., aged 79.
STOCKS.—On Dec. 19th, R. Woolsey Stocks, M.R.C.S., L.R.C.P., D.P.H., M.O.H., West Bromwich, aged 43.
WAUGH.—On Christmas Day, after a short illness, Henry Dunn Waugh, M.D., of Onslow-gardens, S.W.
WIGHTMAN.—On Dec. 19th, John Prest Wightman, M.R.C.S., L.R.C.P. Lond., of Scalby, near Scarborough.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Notes, Comments, and Abstracts.

THE HISTORY OF ANTHRAX IN THE WOOL INDUSTRY OF BRADFORD, AND OF ITS CONTROL.*

BY F. W. EURICH, M.D. EDIN.,

SENIOR HONORARY PHYSICIAN, ROYAL INFIRMARY, BRADFORD; PROFESSOR OF FORENSIC MEDICINE, UNIVERSITY OF LEEDS; AND FORMERLY BACTERIOLOGIST TO THE LATE ANTHRAX INVESTIGATION BOARD FOR BRADFORD AND DISTRICT.

ON Feb. 27th, 1878, there appeared in the *Bradford Observer* the following letter:—

"Sir,—Within a month three woolsorters have died from blood poisoning contracted in the same shed of the same factory in Manchester-road. Occasional deaths from blood poisoning, through the handling of some foreign wools, may perhaps be inevitable, but the recurrence within so short a time of three such cases seems to suggest either that the wool itself, or the shed in which it was sorted, is specially unwholesome. May I hope for your help to induce manufacturers to remedy all that is remediable in this deadly trade? No doubt the death of a woolsorter means to the manufacturer merely the loss of an easily replaceable hand, but to others it means the loss, never to be replaced, of son, husband, or father. That I have just come from one such desolate home must be my excuse for troubling you with this letter."

This letter served its purpose. In the correspondence that followed it another writer pointed out that a score of men had died at Queensbury, six at Shelf, and in one month three out of nine sorters employed in a certain shed in Manchester-road, Bradford. Since that date the interest of the Bradford public in the anthrax question has never waned. At that time the nature of this "blood poisoning" had, of course, not been recognised, though the operatives themse ves, vaguely conscious of its peculiarities, had called it "woolsorters' disease." It was not a new disease at the time of which I speak. The first case appears to have been noted in 1847, soon after the introduction of alpaca and mohair into this part of the country. The medical practitioners had, on the whole, been slow to note the peculiar features of these cases. Dr. Samuel Lodge, sen., had, it is true, investigated one of them, but his investigation had not led him to any hypothesis upon which further researches could be based.

Cause of Woolsorters' Disease.

The letter just quoted, and the feeling roused by it, induced the coroner to order a post-mortem examination, at which Dr. J. H. Bell was present. Looking through his notes, which are in my possession, I find that he has labelled it "Case 7." His interest in woolsorters' disease was therefore not of recent birth. Indeed, he must have had some experience of this class of case, as we find him reading a paper on it before this Society at the March meeting of the same year. It is characterised by evidence of keen observation and careful reasoning—so typical of the man. After outlining the clinical features he discusses the pathology of the condition. He does not think that the disease is due to the inhalation of fibre, dust, and short hairs, for sorters do not appear to suffer more than other workers from cough; employments which are injurious to health from dust cause chronic—not acute—diseases of the lungs; the microscopical structure and chemical analysis of alpaca, camel-, and goat-hair show that they do not vary much from other wools which do not produce these effects; nor does the incidence of the disease appear to depend upon the amount of dust present. He is of the opinion that the disease is caused by the inhalation of a septic poison, but thinks it is a septicæmia caused by the inhalation of germs produced by the decomposition of animal matter. However, Dr. Bell did not hold to this opinion long. A casual suggestion from Dr. Eddison, of Leeds, that the splenic fever of sheep and cattle might be the origin of this disease, caused him to review the evidence and to make further tests. By the autumn of 1879 he had satisfied himself that woolsorters' disease is pulmonary anthrax. His passion for accuracy was such that he could not understand that others might be more careless of the truth. This faith led him at times to accept statements without demanding proofs; and this was particularly in evidence when his practical mind turned to methods of prevention.

Early Preventive Measures.

"How," he says in a later communication, "may they be prevented? Since the subject was ventilated a few months ago Messrs. Mitchell Bros. have had dangerous wools passed through hot water previous to their being sorted. No death nor illness of this kind has occurred from sorting wools so prepared. None can occur. The water removes the septic poison and the dust. If water is objectionable simple exposure of the wool to air for 24 hours is sufficient to render it perfectly innocuous."

Even after his discovery of the true nature of woolsorters' disease, he writes in the *Medical Press and Circular* of Dec. 24th, 1879:—

"I have tried for over two years to impress upon employers the necessity of washing or steaming dangerous wools before they are sorted. This will *certainly* prevent the disease. They will not do this unless compelled."

That preventive measures could be enforced only by legal enactment he, of course, fully recognised; and as a necessary preliminary to this he asked for an independent inquiry by the Medical Department of the Local Government Board. Had he been supported by the medical profession in Bradford, he might have succeeded earlier, but only a comparatively small number of his colleagues took his view of woolsorters' disease. Many, indeed, still doubted that the disease was a pathological entity. His energetic spirit chafed at the delay. What could he do to hasten an inquiry? He was, however, undaunted and fearless, and his opportunity came in the spring of 1880. On May 5th there died in King-street, White Abbey-road, a sorter named Samuel Firth. He had been employed by Messrs. Mitchell and Shepherd, spinners and manufacturers, of Spring Mill-street, Bradford, in sorting Cape and "average" mohair, and later Van mohair. Dr. Bell, having attended the man, reported the case, adding to the certificate of death, which ascribed death to woolsorters' disease or splenic fever, the following remark: "from his employers' neglect in not having the mohair he was sorting disinfected beforehand." A coroner's inquiry necessarily followed and lasted three days. It was pointed out by the firm "that Dr. Bell had said the previous autumn that 'if Van mohair were washed it *could* not be injurious to the health of the sorters.' Now he appends a remark to his certificate to the effect that the mohair was not disinfected. We have done exactly what he said would be effective." Though his position was considerably weakened by this shifting of his ground, Dr. Bell attained his object. Public feeling was deeply stirred and the coroner's jury found that the sorting of all dry Eastern wool and hair is dangerous to life except under effective precautions, and made certain recommendations:—

1. That before the bale is opened it be steeped in salt water and remain in salt water not less than 12 hours.

2. That after the bale has been in water the necessary time the hair or wool be placed in a sud of hot water, washed, passed through rollers, and again washed in fresh sud of hot water, partly dried, sorted when damp, and as early as possible after washing; that the temperature of the water be 120° F. at least.

3. That the room be well ventilated, the floor swept daily, walls and ceilings once a month, and thoroughly cleaned and the walls whitewashed every six months with lime mixed with carbolic acid; that no wool or hair or other material be stored in the sorting room, no meals be taken in the sorting room nor food kept there.

4. That proper provision be made for sorters to wash in water near the sorting room.

And the jury further recommended that if no statutory law existed to enforce these arrangements means be taken to obtain the same for the United Kingdom with the object of placing the sorting of wool and hair under the control and inspection of the factory inspector. This was forwarded to the sanitary committee of the Bradford Corporation, who thereupon conferred with representatives of the sorters and received a number of resolutions from the employers which agreed in the main with those of the jury, but contained two important additions.

Sources of Infection.

The first of these was an attempt at classification of wool and hair from the point of view of noxiousness. Hitherto Van mohair had received almost all the blame; now the materials were ranged in two classes. All average mohair, Cape mohair, peliton, and alpaca are to be sorted as usual while all Van mohair, camel-hair, and Persian wool are to be considered noxious and dealt with—i.e., steeped before sorting. To this second specially dangerous class there are to be added all damaged wools of whatever kind. I mention these two suggestions as they figure largely in later investigations; sufficient now to say that the relative degree of danger was deduced from the incidence only of anthrax among the sorters, and not from examination of the material, and that no definition of a damaged fleece is given, its characteristics being taken as known—erroneously, as will appear in the sequel. It will also be noted

* Being a paper read before the Bradford Medico-Chirurgical Society on the occasion of the centenary of the Bradford Royal Infirmary.

that no mention is made of a precautionary measure which would appear to us to be a very obvious one—viz., the use of fans. This omission was, however, made good as a result of investigations which were carried on more or less independently of each other by three different bodies. (1) The Local Government Board had taken action and had instructed one of its inspectors, Dr. John Spear, to conduct an inquiry. (2) Prof. Greenfield, at that time director of the Brown Institute in London, had been commissioned by the Board of Agriculture to make investigations on its behalf. The importance of the relation of woolsorters' disease to anthrax had just then been emphasised by the occurrence of splenic fever among cattle on a farm at Harden through which the effluent from Harden mills was carried. (3) The third body was the Bradford Medico-Chirurgical Society. In October of 1880 it had appointed 12 of its members as a commission, of which Mr. Meade was chairman and Dr. Goyder secretary, to inquire into the nature of woolsorters' disease. A small subcommittee was appointed to make the necessary laboratory tests, among which were Dr. Bell, Dr. Appleyard, and Dr. Rabagliati. The results of each inquiry were the same. Dr. Bell's discovery was confirmed, and though one or two doubting Thomases remained—e.g., Dr. Tibbits, of Bradford—the identity of woolsorters' disease and anthrax was never again seriously called in question. Henceforth preventive measures and their enforcement engaged the attention of officials, masters, and men. Mr. Spear's report came as somewhat of a cold douche. It certainly had a sobering effect. No washing process which is compatible with the subsequent sorting of wool can give security. No chemical disinfectant has been discovered which will render wool innocuous without damaging it irretrievably; nor can the germs be destroyed except by a temperature so high as to injure the wool fibres. The precautions upon which he would mainly rely are: First, careful separation of fallen fleeces, preferably in the country of export; secondly, scrupulous cleanliness in the sorting rooms and in the persons of the sorters; and thirdly, withdrawal of the dust by fans.

The Local Government Board must have considered the report not sufficiently strong to enable it to take action; at any rate, no regulations enforceable by law were drawn up, and everything was left to the conscience of employers and to the force of public opinion. The regulations which in Bradford had been the outcome of the suggestions made by the jury in the case of Samuel Firth received the assent of the employers and sorters, and were voluntarily carried into effect by the majority of firms dealing with dangerous wools.

Manufacturers and their Critics.

As cases of anthrax continued to occur with distressing though certainly diminished frequency, a second conference was held in Bradford in 1884 between the sanitary committee and representatives of the manufacturers and woolsorters. After considerable discussion the existing rules were extensively amended. The principal amendations were: (1) That no noxious material, alpaca, peliton, and Indian cashmere (an addition to the list of possibly dangerous hair) shall be opened in the sorting room, but in a place specially set apart for the purpose, separate and distinct from the sorting room, and shall be opened over a fan by a person capable of judging the condition of the material. (2) The sorting room for all classes of mohair, camel-hair, Persian wool, cashmere, and alpaca shall be provided with extracting fans in order that the dust arising from the material being sorted may be drawn downwards and thus prevented from injuring the sorters. The great advance of the rules upon the old lies in the inclusion among dangerous material of all kinds of mohair and of East Indian cashmere, and in the adoption of fans. While these rules—like the old—could not be enforced by law, there was some protection against the wilfully careless employer in the fear that some day a coroner's jury might find him guilty of criminal negligence. The majority of manufacturers did conscientiously try to carry out these measures, not only according to the letter, but according to the spirit of the rules; but a few conscienceless men now and again defied popular sentiment. Indignation would then be voiced in the press. Thus we find in the *Yorkshireman* a parody of verses popular in those days:

> I should, were I of hasty turn,
> With indignation boil
> To think of those who fortunes earn
> By letting workman toil
> Amid the deadly Van Mohair
> When at a little cost and care
> Their lives might shielded be.
> In Armley I'd offenders shut
> To take their pick at oakum—but
> It's nought to do with me.

Bell himself was very outspoken, not only against recalcitrant employers, but also against sorters whose supineness he would chide. Thus, in an open letter to sorters, he writes:—

"Is a woolsorter worse than a beast? Said Hodge to the Squire: 'Sir, that hole should be fenced or someone will stray into it and get killed.' Said the Squire to Hodge: 'That's their look out.' Said Hodge to the Squire: 'Your honour has horses; a horse may get in there and be killed.' Said the Squire to Hodge: 'That's a very different matter. If I lose a horse, I lose £80; men cost me nothing. Get the hole fenced.' A man is less valuable than a beast according to the Squire. Does any sane man believe that if Van Mohair killed horses instead of men, it would not be thoroughly disinfected? Most certainly it would; but so long as men cost nothing, and horses cost money, the horses will be better cared for than the men. Woolsorters, are you men? Do you consider yourselves of less value than horses? Will you quietly go on being poisoned from day to day, struck down in a few hours with a horrible pestilence, rather than speak out like men, and refuse to touch the abominable stuff till it has been properly cleansed by those whose duty it is to cleanse it."

Efficacy of Early Preventive Measures.

The next 11 years present little that is of interest administratively or historically. If we examine the effects of the regulations upon the incidence of anthrax in those years we find the number of cases greatly diminished, but this diminution is to be noted almost solely among those operatives who come into contact with the unwashed raw materials—e.g., the openers and sorters. In the various stages that follow upon the washing anthrax still occurred not much less often than it did in the olden days. As no further improvement occurred, and as cases of anthrax were being reported from other parts of the country, a Departmental Committee of the Home Office was appointed in 1896 to inquire into the conditions of wool-sorting and other kindred trades, with a view to the control of anthrax. Meanwhile the sorters were becoming restive, for pending its report, factory inspectors, it was alleged, relaxed the pressure which they had hitherto exercised upon employers to carry out the regulations of 1884.

Hence in places where regulations which were not compulsory had previously been applied these had now been allowed to lapse. One firm was accused of sorting inferior mohair without the protection of a fan, and other firms of having alpaca opened without the assistance of opening hurdles. At length in 1897 the report of the Departmental Committee was published and proved a disappointment. While making no additional recommendation of importance, it asserted that "the suggestion of disinfection, promising as it may appear at first sight, does not bear examination. Anything upon such an enormous scale as this industry would require is hopeless." Furthermore, it errs by defect in not taking into consideration the danger to which carders and combers are exposed.

Regulations by the Home Office.

In February, 1897, Dr. Whitelegge, Chief Inspector of Factories, issued the draft of the long-desired new regulations for wool-combing framed by the Home Office, and which when definitely passed by the Home Secretary would have the force of an Act of Parliament. They were criticised severely both by masters and men, who found an able champion in the late Dr. Hime. As medical officer of health he had been largely instrumental in drawing up the Bradford Rules of 1884, and he now riddled the new regulations with all the eloquence and sarcasm at his command.

After a telling enumeration of all the faults of the new rules he proceeds with his indictment as follows: "Our Parliamentary representatives and Sir C. Dilke have endeavoured to influence the Home Secretary in this matter, but in vain. His regulations are to be obeyed and not to be amended. He has, indeed, promised that if future experience, by which, I suppose, is meant the occurrence of deaths from woolsorters' disease, proves the necessity for greater stringency in the regulations, he may then amend them. The *Observer* to-day attributes to the Superintendent Factory Inspector a statement which, if correctly reported, is one of the most remarkable dicta of historic times. He is represented to have said 'a mistake has been made in London—i.e., at the Home Office.' The sorters have vigorously asserted this all along. The Home Office has stolidly maintained it was right, and now the Superintendent Factory Inspector admits that the department he serves has made a mistake. It has made many." Finally the Home Secretary bent to the storm, and in August, 1897, a draft of the new rules was presented, the Home Office having adopted nearly all the suggestions made jointly by the Chamber of Commerce and the Bradford and District Trades and Labour Council. They fixed the minimum requirements of an efficient opening-screen and sorting-board, and in other and minor points amplified the Bradford rules of 1884, which thereby received legal sanction. Further amendments to these rules were issued in December, 1905, and on Jan. 1st, 1909, statutory regulations for the use of East Indian wool came into force.

(To be concluded.)

PUBLIC HEALTH IN TANGANYIKA.

A REPORT by His Britannic Majesty's Government on the administration under mandate of Tanganyika Territory for the year 1924, recently issued by the Colonial Office, explains that the territory in question consists of a portion of the former colony of German East Africa. The total area is 373,500 square miles, including 20,000 of water. The population, according to the census of 1921, comprised 2447 Europeans (of whom 1598 were British subjects), 9411 British Indians, 789 Goans and Portuguese, 4041 Arabs, 352 Baluchis, 389 unclassified non-natives, and 4,107,000 natives. The European population is composed of officials, missionaries, planters, merchants, and employees of business firms and estates, while Indians and Goans find occupation as shopkeepers, clerks, and artisans.

Medical Services.

The shortage of staff continues, but the position in this respect is gradually improving. During the year under review extensions were made to the hospitals at Kigoma, Mwanza, Songea, Tanga, and Mikiadani, while plans were prepared for new hospitals at Moshi, Kilosa, and Dodoma. It is necessary at present to confine criminal and other lunatics in ordinary jails; this is most undesirable, and the erection of a central lunatic asylum to accommodate both criminal and civil lunatics is about to be commenced. A small asylum and jail for criminal lepers will also be erected at Dodoma. A substantial increase in the attendance at the different medical stations is reported. There are 34 main stations from which returns have been received showing a total of 21,686 in-patients and 146,010 out-patients, with 671 deaths. The great success incident in the treatment of yaws with bismuth has proved of great value in inducing sufferers from other diseases to apply for treatment, and the increase of attendance has been very largely due to the propaganda which has been instituted in this connexion. Besides the figures given above several thousand natives were treated for minor ailments at the smaller dispensaries in charge of African dispensers and dressers. Medical officers and sub-assistant surgeons are not entitled to fees in respect of advice to, or attendance on, African natives. No charges of any kind are paid by these natives for attendance, medicines, dressings, or maintenance at Government hospitals and dispensaries, whether they are treated as in-patients or out-patients, except in the case of Government employees drawing 100*s.* a month or more, and of employees of commercial firms, planters, &c. In regard to maternity and child welfare the initiation of any general scheme to deal with this question must be preceded by careful experiment, and any steps taken must be so designed as to secure that the facilities to be afforded will be acceptable to native women. A European nursing sister was attached to the Health Office at Dar-es-Salaam at the end of the year, and one of her duties is to ascertain by personal investigation the attitude of the natives and to endeavour to gain their confidence and to remove any prejudice existing as regards the treatment of maternity cases in hospital. A small maternity home is being provided in Dar-es-Salaam; should it prove popular with native women similar institutions will be erected in other parts of the territory. The missions still continue to do valuable work among the natives. Apart from general diseases, they devote special attention to the treatment of yaws, venereal diseases, and leprosy. The general sanitation of the townships has been maintained in a satisfactory condition.

Epidemics.

There were no serious outbreaks of dangerous infectious diseases during 1924. A few cases of plague occurred in the endemic areas in the Dodoma and Mwanza districts. Towards the end of the year what was believed to be a new focus of infection was found in the Mbulu subdistrict of Arusha; this outbreak resulted in 17 deaths. The decrease in the incidence of small-pox during 1921–23 was still more marked last year; 30 cases were notified, with 12 deaths. 104,000 vaccinations were performed. Influenza was responsible for 38 deaths, the number of cases not being known. While there does not appear to be any danger of a widespread epidemic of Rhodesian sleeping sickness, it is probable that competent observers would find numerous foci of infection throughout the very extensive area of the territory infested with the tsetse-fly of the morsitans group. In the Mwanza district, where Rhodesian sleeping sickness was found in 1922, a few fresh cases have been discovered, but where the instructions issued to the native chiefs by the senior commissioner have been complied with the disease appears to be completely under control. Early in the year reports were received that a disease resembling sleeping sickness was present in the neighbourhood of Liwale, a subdistrict of Kilwa. That it was sleeping sickness was confirmed at Dar-es-Salaam. The investigator estimated that less than 20 deaths had occurred during 1923 and early 1924; he found only three positive cases amongst the many hundreds of natives examined during his tour. In August a number of deaths suspected to be due to sleeping sickness were reported from the Ufipa district. A few cases of human trypanosomiasis have been reported from Kigoma and Ujiji on the shores of Lake Tanganyika. The medical officer stationed at Kigoma is investigating the question where these cases became infected, whether in this territory or in those adjoining. It is known that *Glossina palpalis* is common along the lake shore and that sleeping sickness was endemic during the German occupation. Clearings at landing and watering places have been maintained as far as possible and no further cases of sleeping sickness had been reported from the lake area up to the end of the year. The position requires further investigation. Treatment with Bayer 205 and tryparsamide (the latter kindly supplied by Dr. Louise Pearse, of the Rockefeller Institute) has been carried out, but reports on the results achieved have not yet been received. Both tartar emetic and soamin are also being used.

Venereal Disease.

The treatment of venereal disease and yaws has been largely extended by the use of soluble salts of bismuth with most gratifying results. A special venereal diseases clinic was opened in the Bukoba district with the view, if successful in attracting the natives, to its general and systematic adoption later throughout the territory. The number of natives presenting themselves for treatment for syphilis was 2667 in 1923, and 4377 in 1924. The large population and its wide distribution render it almost impossible to ensure that any measures directed towards compulsory treatment could be administered satisfactorily. In these circumstances it is considered best to encourage the natives to present themselves voluntarily for treatment, thus ensuring the reduction of infectivity on a large scale. The improvement in the situation as regards yaws has been material, the number of cases treated in 1924 being 20,741, as compared with 3616 in 1923, 3123 in 1922, 1109 in 1921, and 636 in 1920. It is hoped that a still further increase will be effected in future, the organisation for dealing with the disease having now been elaborated.

Climate.

Climate of the territory varies greatly according to the height above sea-level of the several districts. Roughly, four climatic zones can be distinguished, though even among these there are considerable local variations. In the warm and rather damp coast region, with its adjoining hinterland, conditions are tropical and the average yearly temperature is 78° F. The hot and moderately dry zone between the coast and the central plateau is characterised by low humidity of atmosphere, less rain, and a temperature rather lower. In the hot and dry zone of the central plateau, between 2000 and 4000 feet in height, the prevailing characteristics are low humidity, little rainfall, and a fairly high mean temperature, with great daily and yearly variations, sometimes exceeding 36° F. daily. The heat is dry, but not so trying to the European as the moist and steamy warmth of the coast, whilst nights are invariably cool. In the semi-temperate regions around the slopes of Kilimanjaro and Meru, of the Usumbara highlands, the Ufipa plateau, and the mountainous south-western areas (5000 feet to 10,000 feet), frosts occur at the higher altitudes and the nights are cold. These districts enjoy a bracing climate and can alone be considered healthy for Europeans, but prolonged residence in these altitudes is apt to produce nervous strain even though physical fitness is maintained. There are two well-defined rainy seasons annually. Generally speaking, the long rains begin in February or March and last for two or three months, while the short rainy season extends from October to November, but the rainfall is low for a tropical country and droughts are not infrequent.

A GOOD AND CHEAP FEEDING-BOTTLE.

WE have received from the National League for Health, Maternity, and Child Welfare (117, Piccadilly, London, W. 1) a feeding-bottle, evolved after prolonged experiment, which is claimed to be better than any at present on the market. The points about the bottle are that it has a large mouth, has sloping shoulders, has ounce markings all round and half-ounce halfway round, has no awkward parts to clean, is comfortable to hold for feeding, stands steadily in the steriliser, is made of strong white glass, and will stand great heat. The teat is the shape of the human nipple, is easy to clean, and it is stated that it will outlast half a dozen ordinary teats, will not perish in any climate, will not get out of shape, will not split, and cannot be pulled off by the baby. An ingenious feature is the small valve near the base of the teat which enables air to enter as the milk is taken out and so does away with the need for a valve on the bottle itself. This has been tested on ill and well babies and found to work smoothly. The price of the bottle is 4*d.*, of the teat 5*d.*, together 9*d.*, with considerable reduction for quantity. The I.W.C. Feeding-Bottle, as it is called, can be obtained only from the National League at the address given, or from local infant welfare centres.

A CHEERFUL HOSPITAL MAGAZINE.

THE editorial article in the *St. George's Hospital Gazette* for December remarks on the varied styles of hospital journals. They range from "the Athenæum type"—mainly composed of massive theses on obscure technical points—down to the somewhat ribald magazine written by the students for the students about the staff. To attain a happy mean which will amuse and edify everyone is very difficult indeed; but of the *St. George's Hospital Gazette* it can be said that its production and general plan are excellent. A contributor proposes that the hospital should launch a bold campaign of advertisement on the suffering public, and suggests the slogans: "All dressers wear spats and long white coats—Transfusions are performed with the 'best Blue Blood from Belgravia' (unless otherwise labelled)—Every suture is warranted hand-sewn," as likely to appeal to Londoners. Visitors are to be encouraged by a series of couplets such as: "If your life hangs by a wisp, ring the bell and ask for ——," and "Your appendix is a red 'un? Have it whittled out by ——." Whilst amongst more serious verse the nursery rhyme: "Little boy blue, Dyspnœic too, See how he's ailin'—He needs Digitalin," is an example of several that combine elegance with instruction.

AN ANATOMICAL BLACKBOARD.

TEACHERS of elementary anatomy have often attempted to bring home to their pupils some of the facts with which they were dealing by the adoption of methods similar to that utilised by Miss G. Ewart in producing her anatomical blackboard.[1] Fixed points or lines, skeletal or other, were used as foundations on which the remaining parts could be built up or surface markings could be worked out. Miss Ewart, however, has combined on one large sheet the main parts of the body in outline, of a size a little larger than natural, so that the teacher has his wants of this sort at his hand. A simple method is employed by which any of the schemes can be brought to the proper level for the purpose. These schemes will probably be found to be very useful for the purposes which their designer had in mind, and can be recommended in these cases as an aid in teaching. They would not be so useful, probably, where more detailed knowledge and acquaintance is required; for such cases there is, curiously enough, too much in each chart, as, for instance, where the sterno-mastoid is indicated in the neck. Again, in this class, the whole bone is not wanted for surface marking, but only those parts that approach and can be definitely recognised from the surface. The conditions are different, however, among the students for whom these charts are primarily meant, and for these they should prove an agreeable aid.

COPPER IN PEAS.

WHEN attempting to judge the innocence or harmfulness of the practice of adding small quantities of copper sulphate to brighten the colour of canned peas, we may expect to turn to the physiologist for information on two essential aspects of the question—namely, whether the combined copper of the vegetables can be liberated to a dialysable form by the ordinary digestive ferments, and whether experimental animals will absorb and excrete such liberated copper. Dr. J. C. Drummond has made a study of these two questions (*The Analyst*, 1925, l., 481) and his views, without much experimental detail, were given in a preliminary note read at a recent meeting of the Society of Public Analysts. The preservation of the green colour of vegetables on the addition of copper salts is largely due to the formation of a complex with chlorophyll, phyllocyanate of copper. The amount of copper necessary to preserve the vivid natural colour depends on the amount of chlorophyll present; an average of 50 mg. of copper per kilo is sufficient for most green vegetables. If a greater quantity of copper than this is added to the vegetables the excess of copper passes into combination with proteins from which it is certainly set free during digestion with pepsin and trypsin. On the other hand, it has often been asserted that the copper compound of chlorophyll (phyllocyanate of copper) is unattacked by the ordinary digestive juices of the mammalian alimentary tract, so that the metal is excreted without absorption. Dr. Drummond has shown that this distinction between ordinary protein compounds and chlorophyll compounds of copper is a false one, for copper is liberated in a dialysable form after digestion of the chlorophyll compound of copper with pepsin and trypsin. He investigated this question by in vitro and in vivo experiments. The first series of experiments were carried out by digesting peas in collodion thimbles surrounded by a circulating current of water, and these proved that copper was liberated in a dialysable form during digestion. This conclusion was confirmed by a series of experiments on dogs with Pavlov gastric fistulæ. To determine whether the absorption of small amounts of copper is detrimental, Dr. Drummond fed a group of rats on diets containing approximately one-third of their weight in the form of peas, both normal and greened. The rats on greened peas ingested approximately 1·5 mg. of copper daily per 100 g. weight of rat. The animals lived contentedly on this diet, and it is said that records of the animals' weights showed that the groups fed on coloured peas maintained an identical rate of growth with those fed on the ordinary peas. Post-mortems were carried out, and microscopic sections cut at the end of the tests failed to reveal any abnormality of kidneys or liver. We are not given sufficient details of these experiments to judge of their value as evidence, but presumably Dr. Drummond intends to give a fuller account of his work elsewhere, in which he will cite the number of animals used in the tests, the time they lasted, and the weight curves of the animals. In the meantime we may quote Dr. Drummond's final sentence: "The experiments on rats recorded in this paper make it questionable whether it has yet been proved that the absorption of small traces of copper over long periods of time is likely to lead to harmful consequences."

[1] Anatomical Blackboard. London: H. K. Lewis, Ltd. £2 2s.

MEDICAL MISSIONARIES.

IN the current number of *Conquest and Healing*, the organ of the Medical Missionary Association of London, it is stated that there are at present 463 medical missionaries holding British degrees or diplomas in the mission field, and of these 181 are women. The Church Missionary Society heads the list with 79. The United Free Church of Scotland comes next with 69, while third and fourth are the Wesleyan Missions with a total of 43, and the London Missionary Society with 33. The spring course of lectures under the auspices of the Board of Study for the Preparation of Missionaries will be held at the School of Oriental Studies, Finsbury-circus, London, E.C., beginning on Jan. 14th. Another course of lectures for women missionaries on Moral Hygiene in the Mission Field will be given by Miss J. E. Higson, Warden of the Josephine Butler Memorial House, Liverpool, at the S.P.G. House, 15, Tufton-street, Westminster, on Jan. 18th, 19th, and 20th. Full information as to these lectures can be had from the secretary, Board of Study, 2, Eaton Gate, S.W. 1.

A MEDICAL CALENDAR.

WE have received a copy of the eighth medical art calendar, published by J. Philip Kruseman, Noordeinde, The Hague, Holland. The calendar, which is well produced, contains about 27 photogravure reproductions of pictures of medical interest. These are mainly Dutch, and include Rembrandt's picture of Tobias operating under the instruction of the angel, and works by Gerard Dou, the younger Teniers, and many others. Two weeks are allowed for the contemplation of each, and whilst all of them might not be received with acclamation in every part of the home, they form a suitable adornment to the doctor's room and may encourage his belief in the progress of medical methods. The price of the calendar is 6*s*.

LIVINGSTONE COLLEGE.

BY the death of its founder and first principal, Dr. Charles Forbes Harford, the College has lost its most generous benefactor. The need of training in hygiene and elementary medical principles for missionaries out of the reach of skilled advice and in charge of ignorant people is a need which he saw clearly, and to meet it he withstood the opposition which arose when he put his ideas into practice and founded the Livingstone College to provide the necessary training. Students at the College now learn something of the practice of medicine and surgery and get a good grounding in preventive work in hygiene as applied to tropical conditions. A number of physicians and surgeons give their services as lecturers, and clinical demonstrations are given at several hospitals; students may enter for a full course lasting nine months or may come for shorter periods, from one month upwards. During the year a total of 55, of various denominations, received instruction; 42 also entered for short courses on the care of health in the tropics. The accommodation of the College is strained to the uttermost, and although it just manages to carry on with its present income, it would be able to do better work if more funds could be found and necessary repairs and improvements could be put in hand. The continued, and if possible increased, help of its supporters is asked in order that current expenses may be met, and, in addition, an attempt is being made to raise £3500 as a memorial to Dr. Harford. Subscriptions may be sent to the Treasurer, Livingstone College, Leyton, London, E. 10.